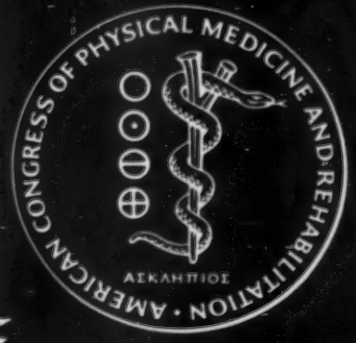

ARCHIVES OF

Physical Medicine and Rehabilitation

OCT 1960

Volume [illegible], No. 10

Archives of Physical Medicine and Rehabilitation

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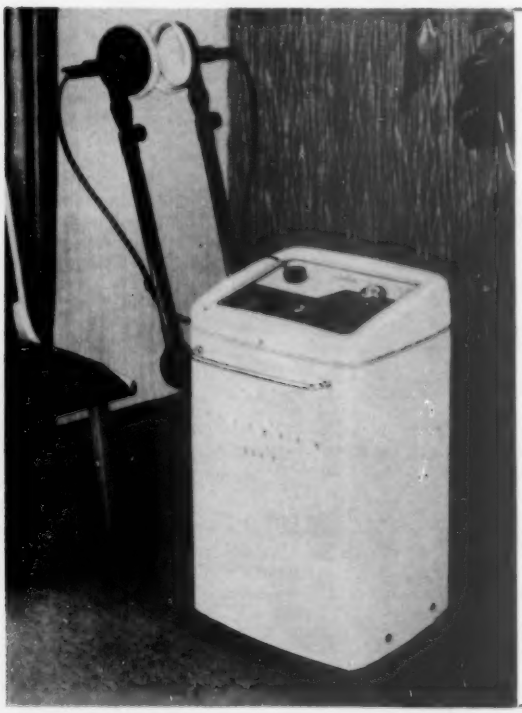

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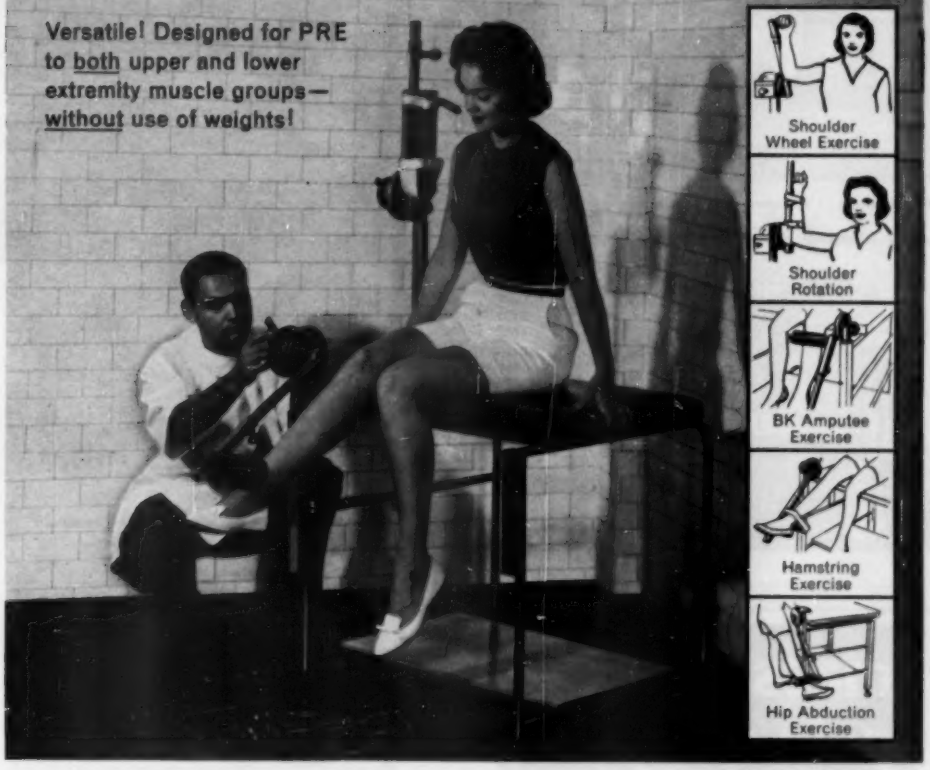

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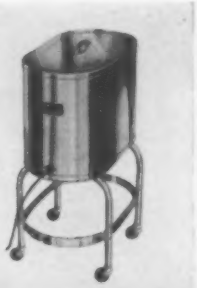

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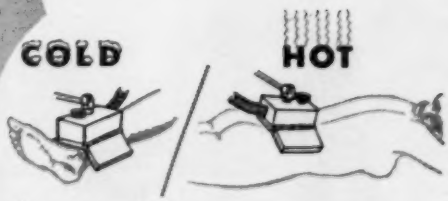

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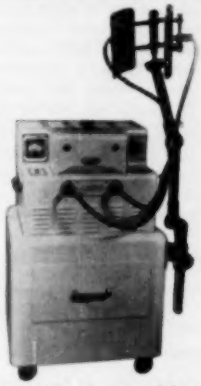

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Pathologic and Clinical Characteristics of Connective Tissue Diseases

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Rochester, Minn.

● The connective tissue diseases still present a real challenge to the clinician's diagnostic and therapeutic abilities, but knowledge of the pathologic changes and physiologic aspects of connective tissue and careful attention to clinically recognized variations in the manifestations of connective tissue diseases can be helpful.

Certain previously accepted concepts relating to connective tissue diseases now are being revised as a result of intensive clinical and laboratory studies. With increased efforts to recognize and to differentiate the various connective tissue diseases and treat them more appropriately, it is likely that a more optimistic outlook will be justified.

The term, collagen disease, is used to designate a group of diseases characterized by chronic inflammation of tissues of mesenchymal origin, but of unknown etiology, that affect multiple systems of the body. Formerly these diseases were considered to be unrelated because of their widely varying (though sometimes overlapping) clinical manifestations.[1]

This paper was presented at a seminar sponsored by the
American Rehabilitation Foundation

The term, as originally proposed in 1942 by Klemperer, Pollack and Baehr,[2] was *not* intended to be a diagnosis, nor to describe *all* the pathologic aspects of these diseases, but indicated, they thought, the site of the characteristic lesion (namely, fibrinoid necrosis of the collagenous fiber).

Derivatives of the Mesenchyme[1, 3, 4]

Derivatives of the mesenchyme are diffusely situated throughout the body and consist of connective tissue, fibroblasts, cartilage (chondroblast), bone (osteoblast), muscle and the reticulum or reticuloendothelial component of lymph nodes, spleen, liver and bone marrow. It has both circulating and fixed-tissue components.

The mesenchyme formerly was thought to function only as a support, passageway or lubricant. But it is now known that the connective tissue as well as other mesenchymal derivatives is a functioning unit of the body (much as is the muscular system, the reticuloendothelial system or other organs). More specifically, the entire system of mesenchymal derivatives may be regarded as a unit or organ of defense, involving protective or immune reactions and reparative functions.

Composition of Connective Tissue[1, 3, 5-9]

Connective tissue, to which attention chiefly is directed at this time, is composed of fibers, ground substance and cells. The fibers are extracellular; the ground substance also is extracellular or, more specifically, interfibrillar.

Connective tissue is a continuous matrix, varying from organ to organ, and differing in consistency from Wharton's jelly of the umbilical cord to bony matrix. Connective tissue per se is acellular, but cells are so intimately and functionally related to the other elements that they may properly be included. Thus there are both extracellular and cellular components.

From the Mayo Clinic and the Mayo Foundation (part of the Graduate School of the University of Minnesota), Rochester, Minn.

Read at the Seminar on Physical Medicine and Rehabilitation, University of Florida College of Medicine, Gainesville, Fla., January 28, 1960.

The fibers or extracellular elements consist of collagen, elastica, reticulin, and basement membrane.

Collagen, which has been studied extensively, is the major fibrous component of connective tissue. It accounts for about 30 per cent of the total protein of the mammalian body. It can be misleading, however, to think of "collagen" as synonymous with connective tissue.

The collagen molecule appears to be a rigid rod of the order of 3000 Å units and 15 Å wide. Even the smallest collagenous fibers visible under the ordinary microscope are seen through the electron microscope to be composed of bundles of minute fibrils, possessing a characteristic repeating band of about 640 Å units.

It also has been shown that collagen molecules spontaneously can aggregate in a highly ordered manner when presented with the proper ionic environment and that the type of organization is dependent on the specific configuration of the molecule itself. This action appears to take place in the absence of enzymes and cells and is reversible; it has been called the "phenomenon of collagen reconstitution."

Studies with C^{14}-labeled glycine have suggested that a soluble fraction of collagen is most likely a precursor of the insoluble fibrils.

Immune globulin (circulating antibody) and collagen are thought to be products of the reticulin and are related chemically to hyalin, a homogeneous matrix produced by cartilage (chondroblast), and to osteoid tissue, the product of the osteoblast.

The amorphous interfibrillar matrix called the "ground substance" fills in the space not occupied by cells and fibers. It lies in the strategic position between the cells and the blood supply and is an intimate and vital link in the transport between cellular elements and the blood lymph system.

It may play an even more important role than collagen in the pathogenesis of connective tissue diseases. Ground substances consist of tissue fluids, mucopolysaccharides and glycoproteins.

The component acid *mucopolysaccharides* have attracted wide attention. They are typified by hyaluronic acid, chondroitin sulfates and heparin. Chondroitin-sulfuric acid is the chief organic chemical constituent of cartilage and chemically is closely related to mucoitin-sulfuric acid, the chief chemical organic constituent of both vitreous humor and synovial fluid. The mucopolysaccharides except for heparin, which seems localized to the mast cell, are distributed primarily in the extracellular, extrafibrillar spaces of connective tissue.

Although the actual biologic significance of mucopolysaccharides is still a matter for conjecture, the mucopolysaccharides always are associated with new formation of connective tissue and seem to diminish considerably as the new tissue matures and ages. Thus ground substance varies in composition and organization from tissue to tissue, and probably also with time.

Many experiments suggest that both ground substance and the fibers of connective tissue are the result of cellular activity, but the possibility has not been ruled out that the ground substance is a transudate from capillaries and that fibrin and collagen fibrils can be formed from plasma clot by mere mechanical factors.

The glycoproteins are proteins to which carbohydrates are covalently bound. In many instances they represent a larger proportion of the solids than do the mucopolysaccharides. With the possible exception of synovial fluid proteins they have not been adequately studied and evaluated.

The cells of connective tissue consist of fibroblasts, lymphocytes, plasma cells and mast cells, and sometimes histiocytes and polymorphonuclear cells.

Interest and emphasis have shifted steadily from the collagenous fiber to the ground substance and now perhaps to the connective tissue cells, especially to the mast cell. No doubt each element is important and interrelated in ways yet to be identified.

The production and maintenance of connective tissue depend not only on the activity of the fibroblasts or other cellular components and products obtained from the blood but also on the regulating functions of certain *enzymes, vitamins* and *hormones.*

The *enzymes* that degrade hyaluronic acid and chondroitin-sulfuric acid are hyaluronidases which appear to be mixtures of several enzymes, some depolymerizing the long-chain molecules, other hydrolyzing aldobionic acid. Action of hyaluronidases in vivo is conditioned in turn by the presence of antihyaluronidases.

Ascorbic acid is the principal *vitamin* that controls connective tissue; it is necessary for the formation of collagen and possibly is a component of chondroitin sulfate.

The principal *hormonal* influences on connective tissue result from thyrotropic hormone which can stimulate production of both ground substance and collagenous fibers and adrenocortical steroids which have special effects that are manifested variously in the different connective tissue diseases.

Relation of Connective Tissue and Adrenocortical Hormone Functions[10]

Among physiologic processes known to be affected by hormones of the adrenal cortex are (1) control of permeability and transfer of inorganic ions and water between extracellular and intracellular tissues (and from blood to urine) and (2) activation of enzyme systems. In patients with adrenal insufficiency, for example, profound alterations of the function of many organs can be controlled to a large measure by regulation of intake of inorganic ions and in such instances multiple enzyme systems are usually affected.

Whatever the mechanisms, steroid hormones alter tissue reaction that follows union of antigen and antibody and by such action the harmful effects of hypersensitivity may be dissociated from the beneficial reactions of immunity.

The widespread effects of adrenal function on mesenchymal tissue, as well as certain metabolic effects, appear to be produced primarily, if not solely, by C-11 oxygenated steroids.

Pathologic Changes[1, 3, 4, 8, 9]

The first recognized pathologic change in the connective tissue in collagen diseases is swelling or edema of the ground substance. This is an early change manifested by the accumulation of a jellylike stainable matrix consisting of mucopolysaccharides, water and other components.

Fibroblastic proliferation also is prominent early. Around the fibroblasts fine reticular fibers appear which are later supplemented by wider adult collagenous fibers.

Phagocytes invade the tissue and proliferate, and lymphocytes, polymorphonuclear cells, monocytes, eosinophils and plasma cells accumulate around small blood vessels and surround the area of greatest damage.

The small blood vessels become more numerous in areas of most severe damage, but the lumina of the blood vessels frequently are plugged, and actual necrosis of arterioles may occur.

Fibrinoid degeneration of the ground substance is another well-recognized pathologic change. Fibrinoid has generally been described as a homogeneous, eosinophilic, refractile, relatively acellular, bandlike structure which has some of the tinctorial properties of fibrin and is thought to result first from depolymerization of hyaluronic acid. Chemical analyses indicate that a protein is involved in its formation, that fibrinoid is probably distinct from collagen and fibrin and that the amorphous ground substance of connective tissue probably precipitates in its formation.

Fibrinoid degeneration of the collagen in the walls of capillaries and the media of arterioles is said to be the earliest organic change and characteristic of connective tissue diseases, but it is not exclusive to these diseases.

The pathologic features of connective tissue diseases, except for fibrinoid degeneration, are similar to the processes of wound healing, although this healing process is inordinately delayed or prolonged, possibly due to stimulation of immune reactions. In the later stages of healing the inflammatory and vascular elements recede and the matrix shrinks, leaving a dense scar of collagen.

Briefly, then, it may be said that connective tissue diseases are the pathologic result of necrosis of collagen, precipitation of ground substance, exudation of fibrin or some other factor in the blood or combinations of these various changes.

Pathogenesis[1, 4, 6, 7]

As is usual concerning diseases of unknown cause, theories of pathogenesis are numerous and varied. Thus viral infection, immunologic dysfunction, and metabolic, hormonal or stress factors, to name a few, have been suspected of being etiologic in connective tissue diseases.

More information is needed concerning the nature and behavior of the tissues affected. Although it is evident that the connective tissue is the prime target of whatever the process is, it is as yet more appropriate to regard connective tissue diseases as *affected* by infection rather than *caused* by infection. No one possible pathogenic mechanism is sufficiently probable that it should be considered to the exclusion of all others.

Clinicians' difficulties with connective tissue diseases may perhaps be attributed to attempts to apply concepts to clinical medicine that are still in the stage of investigation. But as Bauer[6] has so well stated recently, the clinician and the investigator are dependent on each other for important clues that may enhance the investigator's search for basic knowledge and the clinician's diagnostic and therapeutic ability.

Some Clinical Characteristics of Connective Tissue Diseases

The category, connective tissue disorders, includes a variety — if not a changing group — of conditions about which definite disagreement may arise. Generally, the diseases included are periarteritis nodosa, rheumatic fever, rheumatoid arthritis, lupus erythematosus, scleroderma, dermatomyositis, and serum sickness.[1, 2, 4, 5, 8, 11, 12] Also worthy of inclusion according to some authors are inflammatory ocular diseases, glomerulonephritis, malignant nephrosclerosis with hypertension, anaphylactoid purpura, Löffler's pneumonia, erythema nodosum, calcinosis universalis or circumscripta, thromboangiitis obliterans, chronic ulcerative colitis, idiopathic thrombophlebitis, Wegener's granulomatosis and other entities.

This discussion arbitrarily will be limited to six conditions: periarteritis nodosa, rheumatic fever, rheumatoid arthritis, lupus erythematosus, scleroderma and dermatomyositis.

A characteristic pathologic lesion generally is ascribed to each of these six entities, but with increasing experience and study of connective tissue diseases, the specificity of the respective lesions is now being questioned because of their presence at times in patients with diseases other than the one for which the lesion had been considered pathognomonic. However, modern medical practice favors an attempt to distinguish these connective tissue diseases clinically as well as pathologically whenever possible. Definite therapeutic and prognostic implications of importance justify this oftentimes difficult task.

Relative Incidence. Because of differing experiences it might be hard for different authors to agree on even such an apparently simple observation as the relative incidence of these connective tissue diseases. At the Mayo Clinic, in the last four years for which data are available (1955 through 1958), we have had more patients with rheumatoid arthritis than with any of the other five connective tissue diseases listed. Next most common but much less frequent was lupus erythematosus and least common was periarteritis nodosa.

About 73 of each 100 patients affected by the connective tissue diseases under consideration had rheumatoid arthritis; about 13 had lupus erythematosus, about five, scleroderma, about four, dermatomyositis, about three, rheumatic fever and about two, periarteritis nodosa.

Based on this experience, rheumatoid arthritis occurred almost six times as frequently as lupus erythematosus and about 15 to 35 times as frequently as the other connective tissue diseases listed above.

Analysis of the ratio of males to females shows a ratio of approximately two to three for rheumatoid arthritis as compared to approximately one to three for lupus erythematosus and scleroderma, approximately one to two for dermatomyositis and approximately one to one for rheumatic fever. Only in periarteritis nodosa with a ratio of approximately two to one was there a predominance in males.

In spite of wide scattering of ages of patients in all of these diseases, the average age was between 40 and 50 years in all diseases except rheumatic fever in which the average age was much less, about 23 years.

Visceral Involvement. Since involvement of multiple systems is common to all the connective tissue diseases, it is frequently necessary to assess critically all the evidence that can be mustered from clinical, laboratory and pathologic examinations and to recognize whatever selectively important information can be obtained, even though sometimes this is of only limited value.

Serositis, usually with effusion, is found especially in the pleura, pericardium or peritoneum and is most likely to be associated with lupus erythematosus or rheumatic fever. It occurs only infrequently in periarteritis nodosa, rheumatoid arthritis or dermatomyositis and is not a recognized part of scleroderma.

Pneumonitis is most common in lupus erythematosus and scleroderma and is somewhat less likely to occur in periarteritis nodosa or rheumatoid arthritis, although it is being recognized in these diseases more often now than formerly. Pneumonitis is uncommon in dermatomyositis and rheumatic fever.

Myocarditis is, of course, most typical in rheumatic fever but may occur frequently in periarteritis nodosa or to a less extent in dermatomyositis or lupus erythematosus. It is mild and relatively uncommon in rheumatoid arthritis and scleroderma.

Valvulitis also is most common in rheumatic fever, but it may occur in rheumatoid arthritis and occasionally in lupus erythematosus. It is, however, more evident pathologically than clinically in rheumatoid arthritis. It is unexpected in periarteritis nodosa, scleroderma or dermatomyositis.

Renal involvement occurs most typically and most severely in periarteritis nodosa. It may also be a significant feature of lupus erythematosus. It is relatively infrequent and mild if present in rheumatic fever, rheumatoid arthritis, scleroderma or dermatomyositis.

Elevation of Body Temperature. Careful records of the body temperature of patients suspected of having a connective tissue disease may provide information of some differential value. Fever occurs in all patients with rheumatic fever, periarteritis nodosa and lupus erythematosus and in almost all of those with dermatomyositis. It probably does not occur in more than half of those with rheumatoid arthritis and is infrequent in scleroderma. In general, the intensity of the fever parallels its relative incidence, but a fever of less than 100 F. is most likely to occur in dermatomyositis or rheumatoid arthritis although occasionally higher temperatures may be seen. Fever is absent or of low grade in scleroderma.

Synovitis. The synovial membrane is often thought to be such a relatively simple type of mesenchymal tissue that it is capable of only limited reactions. But several signs can be of some differential value in the synovitis of the various connective tissue diseases considered here.

Clinically palpable synovitis is the sine qua non of rheumatoid arthritis, since it occurs in all patients. Synovitis is found somewhat less often but still is present in at least a half to three fourths of the patients with lupus erythematosus or acute rheumatic fever and is infrequent in dermatomyositis, scleroderma and periarteritis nodosa.

Synovitis may be mild, moderate or moderately severe in either rheumatoid arthritis or lupus erythematosus; it is usually severe in rheumatic fever and is rather mild if present at all in scleroderma, dermatomyositis and periarteritis nodosa.

Chronicity of the synovitis — that is, synovitis lasting for more than two weeks — is most characteristic of rheumatoid arthritis. In lupus erythematosus there is considerable variability from no chronicity to that approximating rheumatoid arthritis. Chronic synovitis does not occur in rheumatic fever and is inconspicuous in scleroderma, dermatomyositis and periarteritis nodosa.

The number of joints affected varies but involvement of multiple joints is most characteristic of rheumatoid arthritis, and to a lesser extent is characteristic of lupus erythematosus and rheumatic fever. The number of joints

affected in each of these generally is greater than the number affected in scleroderma, dermatomyositis or periarteritis nodosa.

Residual disability from synovitis tends to parallel chronicity, being most typical in rheumatoid arthritis and lupus erythematosus and typically absent in rheumatic fever, scleroderma, dermatomyositis and periarteritis nodosa.

When the importance of synovitis is judged on the basis of the acuteness versus its other features, it is evident that severe synovitis is especially characteristic of rheumatic fever whereas the other features of synovitis are more typically characteristic of rheumatoid arthritis and lupus erythematosus than of rheumatic fever, and that synovitis is only of slight significance in scleroderma, dermatomyositis or periarteritis nodosa.

Involvement of Fibrous Tissue. Fibrositis, bursitis, tendinitis or capsulitis, or combinations thereof often accompany synovitis; nevertheless the presence of fibrositis has some differential value.

When the inflammatory reaction is maximal in the fibrous tissue rather than in the muscle cells or blood vessels, the predominant symptoms are "gelling" or subjective stiffness with inactivity and limbering with moderate activity. These symptoms are relieved by the appropriate use of heat and salicylates and are known as the fibrositic syndrome.

Fibrositic symptoms are most conspicuous in such diseases as rheumatoid arthritis and scleroderma. When the inflammatory reaction is primarily in the muscle cells or blood vessels, the fibrositic symptoms are minimal even though the disease itself may be severe.

When the fibrositic syndrome is present, evidence of the inflammation usually will be present on histologic examination of the affected tissue, but the symptoms may precede this finding. If the fibrositis is transitory or of short duration, histologic examination may be normal.

The fibrositic component is most frequent in rheumatoid arthritis and scleroderma, occurring in almost all of the patients with these diseases, and in a half to three-fourths of the patients with lupus erythematosus and rheumatic fever, but in only half or less of the patients with periarteritis nodosa or dermatomyositis.

Fibrositic episodes may be acute and transitory (one to two weeks or usually less), or persistent or recurrent to the point of being almost chronic. Acute, transitory flares occur most often in acute rheumatic fever as a part of the migratory arthralgia, although they may be overshadowed by other more generally recognized features of this disease. The incidence of transitory, acute fibrositic flares varies. They may not occur or they may occur in half to three-fourths of the patients with rheumatoid arthritis, lupus erythematosus or scleroderma and they are rather infrequent in periarteritis nodosa or dermatomyositis.

Persistent fibrositic symptoms are a major part of the symptomatology of rheumatoid arthritis and scleroderma, are mild to moderate in lupus erythematosus and periarteritis nodosa, are slight in dermatomyositis and are least prominent in rheumatic fever. Persistence of chronicity of fibrositic symptoms in involved areas is encountered most often in rheumatoid arthritis, scleroderma and dermatomyositis. Chronicity is variable but it may be significant in lupus erythematosus; it occurs less often in periarteritis nodosa and is uncommon in rheumatic fever.

Residual disability from fibrositis is recognized chiefly by fibrosis or fibrous contractures. This is encountered most often in scleroderma, occurring to some degree in all patients. Fibrosis is next most common in rheumatoid arthritis and dermatomyositis, and occurs occasionally in lupus erythematosus. It is not a feature of rheumatic fever or periarteritis nodosa.

Skeletal Myositis. Inflammation of the skeletal muscle or skeletal myositis is distinguished from fibrositis and also from myopathy which is not necessarily the result of myositis.

Myositis occurs in all patients with dermatomyositis and in most of those with scleroderma and periarteritis nodosa. It is found in a fourth or less of patients with rheumatoid arthritis and lupus erythematosus. It is not recognized in rheumatic fever.

Myositis is variable in degree, but the greatest severity is anticipated in dermatomyositis. This is in contrast to the definitely lesser severity in scleroderma and periarteritis nodosa. Skeletal myositis is mild in rheumatoid arthritis and lupus erythematosus and absent in rheumatic fever.

Residual of myositis is manifested by degeneration of muscle cells with scarring, not just by muscle atrophy per se, but resultant disability in affected areas is usual. This is a constant sequel in dermatomyositis, although it is not always severe, and it occurs to a variable degree in most patients with scleroderma. It is insignificant or absent in periarteritis nodosa, rheumatoid arthritis, lupus erythematosus and rheumatic fever. Residual of myositis must be differentiated from the muscle atrophy due to articular damage, disuse or factors other than actual myositis.

Involvement of Skin. Involvement of the skin in connective tissue diseases is either diagnostic or nondiagnostic or nonspecific in nature. Cutaneous changes of both types are most frequent in scleroderma, dermatomyositis and lupus erythematosus. The diagnostic dermal reactions occur in all patients with scleroderma and in half to all of those with dermatomyositis and lupus erythematosus. Occasionally diagnostic periarteritis nodosa of the skin is recognized, but dermatitis is not characteristic in rheumatoid arthritis or rheumatic fever (despite the listing of erythema marginatum as one of the usual criteria for diagnosis of rheumatic fever).

Nonspecific erythema or dermatitis of various types may occasionally occur in any of the connective tissue diseases. They are more likely in dermatomyositis and lupus erythematosus, but are usually transient and relatively minor aspects of the disease.

In scleroderma or dermatomyositis cutaneous or subcutaneous nodules are usually deposits of calcium. In lupus erythematosus nodules which are indistinguishable from the subcutaneous nodule of rheumatoid arthritis do occur. In periarteritis nodosa the nodules are vascular (and much more rarely found than the name would suggest). In rheumatic fever fibrous nodules are found occasionally in the subcutaneous tissue. When typical, they can be differentiated from those of rheumatoid arthritis or lupus erythematosus, although differentiation is not always easy.

Raynaud's Phenomenon. Raynaud's phenomenon occurs most prominently, most typically and most severely in scleroderma; it is present in about a half to three-fourths of such patients, and is much more frequent in females than in males. It is seen only infrequently in each of the other connective tissue diseases except rheumatic fever. Ulceration has some propensity for complicating Raynaud's phenomenon in scleroderma.

Peripheral Neuritis. Peripheral neuritis may result from several different causes but is most characteristically the result of the arteritis of periarteritis nodosa. An arteritis also may produce peripheral neuritis but to a lesser extent in rheumatoid arthritis. Peripheral neuritis is infrequent in lupus erythematosus, scleroderma and dermatomyositis. In rheumatoid arthritis it also may occur as a result of mechanical pressure on exposed or relatively exposed nerves such as the ulnar or peroneal nerves, or it may result from perineural fibrositis in adjacent nerve or tendon sheaths such as the median neuritis of the carpal tunnel syndrome. Mechanical pressure or inflammatory reactions may occasionally produce peripheral neuritis in lupus erythematosus, scleroderma or dermatomyositis, but peripheral neuritis from any cause is not a recognized part of rheumatic fever.

Involvement of Central Nervous System. Involvement of the central nervous system by connective tissue diseases may take the form of encephalopathy, convulsions, agitated disorders, psychoses or cerebrovascular accidents.

The manifestations of the central nervous system are most characteristic in lupus erythematosus or periarteritis nodosa, but even in this disease they are relatively infrequent compared to involvement of other organs and systems. They are less frequent in rheumatic fever, rheu-

matoid arthritis and dermatomyositis and are not a feature of scleroderma.

Severity and residual generally parallel relative frequency in this manifestation and vary from case to case.

There are, of course, *other clinical features* of connective tissue diseases in addition to those included within the limits of this discussion.

Hematologic Abnormalities. Clinical observations in the differential diagnosis of connective tissue diseases are important and helpful and should be stressed, but certain laboratory data may be helpful also, chiefly information about hematologic abnormalities, some of which are listed below.

The concentration of hemoglobin is generally normal or low in rheumatoid arthritis or lupus erythematosus. The leukocyte count is typically, but not constantly, low in lupus erythematosus and high in periarteritis nodosa and rheumatic fever. Mild variations in either direction occur in rheumatoid arthritis or dermatomyositis, whereas a normal leukocyte count is the rule in scleroderma.

Eosinophilia occurs most often in periarteritis nodosa and dermatomyositis and occasionally in lupus erythematosus.

The erythrocytic sedimentation rate generally is high in connective tissue diseases, being generally highest (more than 80 mm. in one hour, Westergren) in rheumatic fever and periarteritis nodosa. High values (more than 60 mm.) may occur in lupus erythematosus an rheumatoid arthritis but a normal rate or a slight increase is occasionally found in the early stages of rheumatoid arthritis and paradoxically in lupus erythematosus and periarteritis nodosa when the patient may be severely ill. Slight elevations (to less than 40 mm.) usually are seen in dermatomyositis and scleroderma, although in the latter, occasionally the sedimentation rate may be high.

Lupus erythematosus cells occur in all or most of the patients with lupus erythematosus but may not warrant stress as a pathognomonic finding which they sometimes receive. These cells are found in 5 per cent of patients with rheumatoid arthritis,[10] are rarely found in periarteritis nodosa and dermatomyositis, and are not found in scleroderma and rheumatic fever.

Reversal of the albumin-globulin ratio occurs most prominently in lupus erythematosus, is frequent in periarteritis nodosa and is present occasionally in rheumatoid arthritis, rheumatic fever, dermatomyositis and scleroderma. Studies of electrophoretic patterns of serum proteins show various alterations, usually increases, in alpha-1, alpha-2, beta or gamma globulin. However, a diagnostic pattern for each connective tissue disease is not known as yet and now appears unlikely.

The rheumatoid factor which is thought to be as specific for rheumatoid arthritis as the lupus erythematosus cell is for lupus erythematosus is seen only rarely if at all in the other connective tissue diseases. The reason for this is not known as yet, but again it may be misleading to substitute this finding or the result of any other laboratory test for careful consideration of clinical data.

Biologically false positive serologic reactions are more characteristic of lupus erythematosus than of the other connective tissue diseases but are nonetheless only infrequent in this disease. Although false positive serologic reactions may occur in rheumatoid arthritis, dermatomyositis or scleroderma, they are even less frequent than in lupus erythematosus, and they are not expected in periarteritis nodosa and rheumatic fever.

Use of Adrenocortical Steroids in Connective Tissue Diseases

The different treatments of connective tissue diseases are one of the reasons for making a serious attempt at differential diagnosis. This is especially evident in adrenal steroid therapy.

Steroid therapy is especially indicated for periarteritis nodosa and rheumatic fever, and high dosages generally are used for relatively short periods. In lupus erythematosus and dermatomyositis steroids are best adapted to control of flares or crises in which instances high dosages may be needed; intermittent treatment is preferable to long-term therapy, however.

Steroids are not needed for all patients with rheumatoid arthritis, but when used, low dosage is preferred because prolonged treatment generally is required. Steroids are rarely indicated and are of limited value in scleroderma. However, future improvements may alter present opinions regarding use of adrenal steroids in each of the connective tissue diseases.

Prognosis

The value of differential diagnosis in connective tissue diseases is reflected not only in differences in therapy of the various diseases but also in the varying prognosis of the conditions.

The greatest tendency to remission occurs in rheumatic fever and to a less but important degree in dermatomyositis and lupus erythematosus. Rheumatoid arthritis is also potentially reversible. Remissions occur only infrequently in periarteritis nodosa or scleroderma.

Morbidity is greatest in scleroderma, periarteritis nodosa, lupus erythematosus and dermatomyositis and is much less in rheumatoid arthritis and least in rheumatic fever.

Mortality from connective tissue diseases is greatest in periarteritis nodosa and lupus erythematosus. It is somewhat less but still may occur in a half or more of the patients with dermatomyositis, scleroderma or rheumatic fever. Rheumatoid arthritis has the least tendency to mortality.

Summary

The connective tissue diseases still present a real challenge to the clinician's diagnostic and therapeutic abilities, but knowledge of the pathologic changes and physiologic aspects of connective tissue and careful attention to clinically recognized variations in the manifestations of connective tissue diseases can be helpful.

Certain previously accepted concepts relating to connective tissue diseases are now being revised as a result of intensive clinical and laboratory studies. With increased efforts to recognize and to differentiate the various connective tissue diseases and treat them more appropriately, it is likely that a more optimistic outlook will be justified.

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Information relative to securing reprints of this study may be had by checking the Reader Service column on page iv of this issue.

Preliminary Report of Evaluating and Classifying the Vocational Potential of the Cerebral Palsied

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and
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● A medically supervised, vocational program of 16 months duration, involving young adults with cerebral palsy, is being analyzed. The patients are classified into four categories. More than 100 patients are being screened. Manual dexterity, basic vocational tools and equipment, and basic academic skills are tested. Practical conclusions are presented.

In St. Louis the work of the Youth and Adult Center for the cerebral palsied was changed three years ago from a recreational to a vocational program. In making the change we soon recognized the difficulty of the problem and we share the conclusion of a 10 year study of the various types of disabilities; it listed cerebral palsy cases at the bottom for vocational rehabilitation.[1]

Although we wanted to analyze our cases and classify their potential for vocational rehabilitation our study was delayed by a lack of funds.

Most programs in the past were restricted to physical therapy and surgery and were only for children. During the last few years more attention has been paid to the young adult. The experience of rehabilitation centers throughout the country shows the usual methods for determining vocational potential are not adequate for the cerebral palsied. They show much of what the individual cannot do, and little of what he can do. When conventional tests are used the adaptations make the validity questionable.

The Institute for the Crippled and Disabled in New York City pioneered and developed the work sample technic of determining vocational potential.[2] This technic for determining vocational potential tries the individual in a test situation which attempts to reproduce all pertinent job requirements. The test situation therefore, is likely to be a valid predictor of the ability to perform in the job area which it represents. In addition, this technic provides an opportunity to observe and evaluate the integration of the individual's physical, mental and emotional makeup within a work environment. In 1957 the federal government, in recognizing the unmet needs in cerebral palsy rehabilitation, made available demonstration and research grants for establishing work classification and evaluation projects for the cerebral palsied.[3] A proposal of the previous year was submitted again and changed as required by the Federal Office of Vocational Rehabilitation. A Work Classification and Evaluation Project was established at the Buder Youth and Adult Center which is one of three cerebral palsy centers in St. Louis.

Purpose

The purpose of this project is to evaluate and classify the vocational potential of cerebral palsied adults. To show the vocational potential of the cerebral palsied from a practical standpoint, it is based on more than one year's experience of a continuous project.

Description of Project

All candidates for the project are evaluated by the physiatrist who serves as the medical supervisor of the project. The cases then are reviewed for admission by a committee of members of the staff under the chairmanship of the project director. The criteria for admission to the project is:

1. There must be a specific diagnosis of brain damage which creates a vocational handicap. If there are seizures, they must be under control.

Director of Physical Medicine and Rehabilitation, St. Louis University Group of Hospitals, and St. Louis University, Division of Health and Hospital Services.
Coordinator, Youth and Adult Center, United Cerebral Palsy Association.
This demonstration and research project was made possible by funds from the Federal and Missouri State Office of Vocational Rehabilitation.

2. There should be reasonable assurance that the individual can function within the project environment.

There is no restriction as to the cause of the brain damage. All clients, however, must be cases for diagnostic evaluation by a state vocational rehabilitation agency.

The project lasts for seven weeks, five days a week from 9 a.m. to 3:00 p.m. The first week is spent in orientation, psychologic testing, speech evaluation and determining the basic manual dexterity of the client. The client is evaluated by a team composed of an evaluator, an occupational therapist, a vocational counselor, a speech therapist and a physiatrist. As each group completes the evaluation another is ready for admission. The cost of the evaluation program is met by the State Office of Vocational Rehabilitation.

The basic areas of exploration are:

1. Basic manual dexterity
2. Basic vocational tools
3. Basic vocational equipment
4. Basic academic skills

The basic manual dexterity items include: placement of straight pins, placing B.B. shot, sorting screws and etc. These tests are administered by the occupational therapist. These are graduated tasks leading to assembling items such as: fountain pens and flash lights.

The basic vocational tools are: use of hammer, pencil, screw driver and scissors. Tests involving these tools are administered by the job sample evaluator.

The basic vocational equipment includes using such items as motor buffer, drill press, and sewing machine; these also are administered by the job sample evaluator.

The basic academic skills are, of course, reading, writing, arithmetic, and handling money. This area is supervised by the vocational counselor.

There are 77 job samples in 14 basic categories. They are expanded from basic to advanced areas where it would be possible to administer 171 different tests to each client. Some items are not applicable to all clients. For example, tire changing would not be an indicated job for girls.

Discussion

Since April 1, 1958, a total of 102 clients have been screened for possible admission to the project. Only 46 were considered to have vocational potential on initial screening. Of the 46 that were submitted to the Admission Committee, 39 were approved for admission. The other seven were felt to be at their maximum level of rehabilitation. Out of these, 29 have completed the program. All clients periodically are reviewed in staff meetings with the staff reports based on actual accomplishments. The clients' performance is based on the quality and quantity of the work.

Our analysis is based on the 29 clients completing the program. There were more quadriplegics than any other disability. Speech was involved in 66 per cent of the cases. There was a severe speech involvement in 37 per cent of the cases. The appearance of normalcy and neatness which is important for vocational placement was poor in 72 per cent of the cases. This was changed to 50 per cent of the cases by our program. The average age was 25; there were nine females and 20 males. All but 7 per cent were ambulatory without assistance and 76 per cent of the cases had a noticeable gait disorder.

The clients are put in four classifications:

I. The individual is ready for direct placement in a given type of job as shown by performance.

II. The individual is recommended for training in a specific job area as shown by performance.

III. The individual is recommended as having sheltered workshop potential at the time of the evaluation.

IV. The individual at this time is not feasible for vocational rehabilitation.

Analyzing the performance of completed cases, a wide range is noted in almost each category of testing (see tables 1-5). There is, however, a gathering of cases in the substandard area of performance for each of the job samples.

Statistical Information

Table 1: Diagnosis

Spastic	14	Mixed	3
Athetoid	9	Left Hemiplegia	3
Rigidity	1	Right Hemiplegia	4
Ataxia	1	Monoplegia	1
Tremor	1	Paraplegia	4
Atonic	0	Quadriplegia	17

Table 2: Speech

Intelligible for prime vocational use	10
Intelligible but slightly awkward — secondary vocational use	8
Intelligible but awkward — little vocational use	7
Barely intelligible	2
Unintelligible	2

Table 3: Range of Intelligence

Verbal Scale		Performance Scale		Full Scale	
I.Q.	f	I.Q.	f	I.Q.	f
110-125	4	110-125	3	110-125	4
95-109	13	95-109	5	95-109	4
70- 94	7	70- 94	10	70- 94	11
45- 69	4	45- 69	8	45- 69	6
Range: 52-123		Range: 47-117		Range: 49-119	

Table 4: Previous Work Experience

More than 5 years	6
1 to 5 years	2
Less than 1 year	2
No previous work experience	19

Table 5: Final Classification of Clients

I	11
II	3
III	6
IV	9

Our data suggests the most important prognostic factors are not I.Q. and job sample performance. The psychosocial considerations such as emotional stability and motivation are of greater importance. A patient's low level of maturity, an inability to accept himself and an unrealistic attitude toward employment lowers his chances for vocational rehabilitation.

Summary and Conclusions

It seems the vocational potential in any realistic project is poor for the more severely involved cerebral palsied individual. Only 24 per cent of our people could be placed. They hold such jobs as these: office clerk, newspaper vendor, occupational therapist aide, mail clerk, dry cleaning routeman, packer and photo retoucher. Their salaries range from $15 to $50 a week. Even these may not hold the job under any unusual circumstances. The great majority of these people appears able to be productive only in a sheltered sympathetic environment.

Clients with a high I.Q. did not necessarily perform at a higher level than those with a lower I.Q. With our people there is not a correlation between I.Q. level and performance. In working with the cerebral palsied, stress should be placed on the "adequacy of the individual." It is our feeling the important factor is called "A.I." It includes qualities pertaining to the practical application of his functional intelligence. The interference of his physical disability places limits on the utilization of his intelligence. Higher intelligence does not increase his vocational potential. For example, a genius without hand function or speech cannot utilize his vocational potential and would not be considered a vocationally adequate individual.

In our program it appears as if those from smaller communities and those who had less agency exposure during childhood do better and adjust more readily to the project.

Out of 102 clients screened, 29 completed the project; eleven were classified I, ready for placement; three were classified II, recommended for training; six were classified III, having sheltered workshop potential; nine were classified IV, having no vocational potential.

Seven of those who were classified I were placed in employment. Problems of adjustment were significant. The most realistic goal for the majority of the cerebral palsy population appears to be a sheltered workshop. The tensions of com-

petitive employment seem to increase their musculo-skeletal and emotional defects.

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Information relative to securing reprints of this study may be had by checking the Reader Service column on page iv of this issue.

VERY IMPORTANT

The next examinations, written and oral, of the American Board of Physical Medicine and Rehabilitation will be held in New York City, June 24 and 25, 1961. The final date for submitting application is February 15, 1961. Write to the Secretary, Dr. Earl C. Elkins, 200 First Street S. W., Rochester, Minnesota, for application.

Use of Ultrasound in the Treatment of Pressure Sores in Patients with Spinal Cord Injury

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● Based on clinical observations alone the authors believe that ultrasonic therapy in pressure sores is effective in relieving congestion, cleansing necrotic areas and promoting healing with healthy, nonadherent skin approaching normal thickness. This was especially striking in areas directly over bony prominences such as the sacrum. It is probable that the effect of ultrasound on membrane permeability and the size of the protein molecule play a major role, aside from the heating effect which, in this series, was most likely negligible. From clinical observations it would appear that a scientifically controlled study in this area would be richly rewarding.

Along with urinary tract disorders, spasticity and contracture deformities, the pressure sore is recognized as one of the most serious and frequent complications in the management of the patient with a spinal cord injury. Recent literature[1-4] reveals that the basic principles of prevention and treatment of this complication have become fairly well standardized and include nursing care, medical, surgical and physiatric measures. It is not the purpose of this brief report to discuss these established principles but rather to report our early experience with the use of ultrasound, which we have found to be a safe and effective adjunct in the treatment of these lesions. We have been able to find only one other reference in the American literature to the use of this modality for this purpose.[5]

During the past two years at the Veterans Administration (McGuire) Hospital, Richmond, Va., a paraplegic center with a cord injury service of approximately 182 beds, 23 cases of pressure sore received ultrasonic therapy. This modality was applied as an addition to the presently accepted treatment. At first, these cases were selected on the basis of their failure to show adequate response to the usual treatment methods. The sores had failed to heal or had failed to remain healed following other treatment modalities. This category constitutes the bulk of the series cited here. As we gained experience with the technic, however, we added ultrasound in the preparation of the ulcerated sites for plastic surgical intervention. We also used it in cases where there was clinical evidence of incipient skin breakdown, manifested by redness or blistering, without actual ulceration.

Technic

The ultrasonic energy used in this study was supplied by a 10 cm. round transducer head, applied with a constantly moving head either under water or with mineral oil coupling; the dosages were 1.0 watt per sq. cm. and 0.5 watt per sq. cm., respectively. The time of each treatment varied from two to four minutes, depending on the area to be covered. Treatments were given three times a week for a total of six treatments a course; up to three courses were given with rest periods of one or two weeks between.

Results of Therapy

Of the 23 patients treated with ultrasound, 13 healed, five showed definite improvement but had not completely healed by the time treatment was discontinued or this report was written; and five showed equivocal responses. Of the latter five cases, two had treatment interrupted to perform plastic surgery. Of the 13 patients with ulcer that healed, only one is known to have subsequently broken down, this breakdown occurring after two months, apparently due to friction from a lumbosacral belt. One of

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the 13 patients who had previously healed without ultrasound and had later broken down seemed to respond much more rapidly and healed with better skin when treated with ultrasound. The five patients who improved but did not heal at the time of this report (June 17, 1959), all showed a cleaner, healthier base and a healthier looking tissue surrounding the ulcer itself. In none of the cases was any adverse effect noted.

The following case history illustrates typical responses to therapy: G. H., a 36-year-old male, was readmitted to this hospital on May 12, 1959, because of pressure sores over the left knee and left lateral malleolus. He had sustained injury to the cervical cord on July 5, 1947, in a diving accident, with resulting incomplete quadriplegia at the level of the seventh cervical vertebra.

For 18 months before this admission, the patient had a pressure sore overlying the left patella which failed to heal despite treatment with hydrotherapy, ultraviolet, varidase ointment and bacitracin ointment dressings, and a supportive dietary regime. Several weeks before his admission, a second pressure sore developed over the left lateral malleolus. On May 20, 1959, ultrasonic therapy was added to the regime of varidase and bacitracin dressings. Treatment was given at an intensity of one watt/cm.^{2} under water three times a week for six treatments. At the onset of ultrasonic therapy, the ulcer was approximately 3 cm. in diameter with a necrotic base, undermined edges and surrounded by purplish, congested adherent skin (fig. 1). By May 29, 1959, the necrotic tissue had diminished and the surrounding skin was less congested (fig. 2).

A second series of ultrasound was initiated on June 10. By June 26, the necrotic material had completely disappeared (fig. 3). The base of the ulcer was clean, pink and healthy in appearance and there were signs of epithelialization at the edges. The surrounding skin was pink, nonadherent, and showed good tissue turgor. The ulcer over the left lateral malleolus showed similar, although less striking, response. The patient still was under treatment at the time this was written.

Comment

Based on clinical observations alone, we are of the impression that ultrasonic therapy in pressure sores is markedly effective in relieving congestion, cleansing necrotic areas and promoting healing with healthy, nonadherent skin approaching normal thickness. This was especially striking in areas directly over bony prominences such as the sacrum. In our opinion, it is probable that the effect of ultrasound on membrane permeability and the size of the protein molecule play a major role, aside from the heating effect which, in our series, was most likely negligible. From our clinical observations

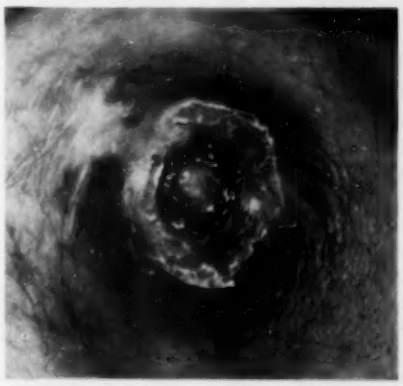

Fig. 1 — May 20, 1959: large ulcer over the patellar area prior to treatment with ultrasound. Note necrotic exudate, discolored and congested surrounding tissue and adherent skin at margin of crater.

Fig. 2 — May 29, 1959: ulcer responding to therapy with cleaner and healthier crater, signs of beginning granulation and skin approaching normal appearance with early demarcation at margin.

Fig. 3 — June 26, 1959: later results of treatment. No necrotic tissue evident, healthy granulating base and well demarcated margin. Skin shows normal appearance. Note lack of cicatricial reaction of skin and subcutaneous tissues.

it would appear that a scientifically controlled study in this area would be richly rewarding.

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Information relative to securing reprints of this study may be had by checking the Reader Service column on page iv of this issue.

A cynic is a man who knows the price of everything, and the value of nothing.

— OSCAR WILDE

Diagnostic Challenge of Back Pain

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● When a patient presents himself for examination with a primary complaint of back pain it is commonly assumed that the most likely etiological basis for the difficulty is a musculoskeletal disorder. In actuality even in those instances in which trauma to the musculoskeletal system is a known factor the symptoms are not always related. The human back can mirror referred pain from a diversity of other anatomical sources and etiologic agencies. Some of the more significant causes of back pain encountered in the course of a consulting practice in general hospitals during the past five years is reviewed and analyzed. Their importance to the physiatrist is self-evident, and this survey concludes the physiatrist is the clinician most capable of assessing the true meaning of back pain.

The physiatrist occupies a singularly strategic position in the evaluation of the ubiquitous symptom of back pain. A working knowledge of functional anatomy, clinical neurology and internal medicine are the daily stock-in-trade of the competent practitioner of our specialty, but to these must be added a high index of suspicion and a staunch refusal to accept the obvious as necessarily correct.

No group of symptoms is more vulnerable to misinterpretation than those we glibly label "back pain." The diagnostic challenge they present often provides a severe test of clinical judgment. The basic problem here is the same as elsewhere in the practice of medicine. A physical treatment program based upon a presumptive etiology of back pain may not only fail of its therapeutic goal but also it may result in the exacerbation of an undiagnosed disease process. This is detrimental to the patient and to the standing of our own specialty. Despite the impatience of the referring physician for quick results, no treatment program may be undertaken until a definitive diagnosis has been made. The dangers inherent in any other approach have been demonstrated repeatedly to me during the past five years as director of a physical medicine service in a large general hospital. I am not concerned here with the more commonplace posttraumatic pain syndromes, such as lumbosacral strain, herniated intervertebral disc, postural back strain and spondylolisthesis, but rather those conditions which, although simulating a congenital or posttraumatic lesion, are actually on an entirely different pathologic basis. A strong word of caution is needed. Many patients who appear to be in the category of those who have a specific traumatic onset of back disorder actually are in an entirely different category. The wise physician will scrutinize carefully the history of trauma and, while accepting it, make the necessary mental reservations to allow himself to avoid the unforgivable error of failing to find the real basis of the complaint.

Confusing Problem

Perhaps one of the most confusing diagnostic problems presented to the clinician is occlusive arterial disease. In arteriosclerosis obliterans of the ordinary type, involving the arterial segments between the knee and the ankle, the classic history of intermittent claudication, pallor on elevation of the extremity, rubor on dependency, pre-gangrenous changes in the toes and the absence of arterial pulsations in the dorsalis pedis and posterior tibial regions—as demonstrated by palpation or oscillometry — leaves little room for confusion.

Unfortunately not all cases of arteriosclerosis obliterans present themselves in such a neatly packaged syndrome. Occlusions in the femoral and iliac arteries, as well as the aorta itself forming the syndrome of Leriche,[1] are not uncommon. The insidious onset of this syndrome may allow for grave diagnostic confusion. Such patients may experience intermittent claudication in the thigh, the buttocks and the lower part of the back instead of in the calf as we normally anticipate. Even when present in the calf it may be associated with a similar pain in the buttock and thigh; it can be confused readily with pain of sciatic radiation such as occurs in the herniated intervertebral disc. The muscle

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spasm which occurs with this syndrome similarly may be confused with the protective muscle spasm resulting from a primary back disorder. Add to this the neuritis following the distribution of a peripheral trunk, the pre-trophic rest pain involving the digits of the affected foot and frequently the calf and the frequent development of muscular weakness and atrophy in the extremity,[2] and the possible diagnostic misinterpretation becomes apparent. In the present era of diagnostic aortography and the possibility of restoration of peripheral circulation by aortic or femoral grafting, the alert clinician cannot afford to overlook this diagnostic entity whenever he is presented with the onset of progressive back pain, with radiation into the extremities and with only a questionable history of trauma. Despite popular belief to the contrary, the presence of pedal pulses — either on finger palpation or by oscillometry — does not rule out the possibility that claudication may be the cause of the back and leg pain as a result of the occlusion of an iliac artery[3] or, more rarely, coarction or occlusion of the aorta itself.[4] In any individual of middle age or older with a syndrome of undiagnosed back pain, vaguely suggestive of the pattern of discogenic disease or chronic lumbosacral strain without trauma, the possibility of obstructive arterial disease of the aorta or iliac arteries must be seriously considered. The clinician will of course have exhausted the other possibilities, including routine roentgen studies and myelography, before he ventures into the more controversial field of aortography, but he should not lack the courage to do so when the indications are present.

Uncommon Syndrome

More uncommon than this, but still not rare, is the syndrome of dissecting aneurysm of the aorta which presents itself only with the symptom of back pain. Classically this disorder has been described as occurring with a sudden precordial pain radiating through to the upper dorsal spine and gradually progressing down the back as the dissection occurs. However, in several cases which I have personally observed, the onset was sudden and dramatic while the individual was attempting to lift a fairly heavy weight; it came as upper lumbar back pain with radiation into one or both lower extremities. The possibility of confusion with a traumatic back disorder is obvious under such circumstances. In two of these cases the associated finding of absent arterial pulsations in one lower extremity with no previous history of arterial disease suggested the diagnosis of dissecting aneurysm; this was confirmed on the operating table in one instance and at postmortem in the other. The patient who was subjected to surgery survived for two weeks but ultimately succumbed to a rupture of the aorta.

The description of the clinical entity of herniated intervertebral disc by Mixter and Barr[5] has too often provided the careless clinician with an excuse for diagnostic superficiality. Even where the classic signs of low back pain are present — sciatic radiation increased by coughing, sneezing, or straining with diminished knee or ankle reflexes and sensory disturbances of the involved dermatome — this still remains a syndrome and not in itself an automatic diagnostic label. The symptoms and signs which are presented under these circumstances simply indicate the presence of an extra-dural, space-occupying lesion with secondary nerve root compression. The same findings may well be present in other extradural, space-filling lesions either of benign or malignant neoplastic origin. The failure to properly evaluate the presence of such a condition may result in incalculable harm to the patient. A high index of suspicion for the presence of a neoplasm must be maintained when the onset has been slow and not directly relatable to a specific trauma, when the nerve root involvement spans more than one spinal segment, when the spinal fluid protein seems unusually elevated for the demonstrable degree of neurological involvement, and when the pain in the back or peripheral radiation is persistent while at rest and particularly at night. It is wise to continue to maintain such suspicions despite the report of negative myelography and to follow carefully such patients to detect the early development of progressive neurologic changes. The

ependymoma, originating in the filum terminale, and similar tumors of the cauda equina are most often confused with syndromes of musculoskleletal origin. By the time they have grown sufficiently large to produce nerve root compression, symptoms may be precipitated by any sudden straining movement resulting in intractable pain very readily confused with discogenic disease or lumbosacral strain. One must not overlook the fact that intramedullary spinal cord tumors at any level within the spinal-cord may produce — by compression of the pain conducting fibers in the spinothalamic tract—referral of pain to widespread peripheral areas far removed from the spinal cord segment which is the location of the lesion. In any case, then, in which a pain syndrome appears to be of nerve root origin, can be only poorly localized, and responds little or not at all to treatment by physical means, there is the possibility that an intramedullary tumor exists.

Bone Disorders

No discussion of masquerading back pains could be complete without touching on the metabolic bone disorders. It is a well known clinical fact that osteoporosis may produce diffuse backache even where no compression fracture has occurred; this particular point needs little additional emphasis since osteoporosis usually will be detected as part of a routine examination involving roentgen studies. However, two additional conditions frequently plague the unwary clinician. These are the osteitis fibrosa cystica associated with hyperparathyroidism and the osteitis deformans of Paget. In hyperparathyroidism there are three classical groups of symptoms which are well known. These are due, first, to the excretion in the urine of pathologic amount of calcium and phosphorus; second, to the physiologic effect of hypercalcemia and, third, to the impaired structural rigidity of the skeletal members themselves. We are here concerned primarily with the last group. Gutman and his co-workers[6] have shown that pain of skeletal origin in the lower extremities and the spine is common even without the pathologic fractures and bony deformities which will occur in an advanced example of the condition. The pain is the result of the structural instability of the involved bony members; it is intensified by activity and by local pressure against bony prominences. The diagnosis becomes self-evident when bone cyst formation has occurred, when homogeneous decalcification has become widespread, when spontaneous fractures are apparent, and when renal disease and the other systemic symptoms of hypotonia, weakness and lassitude appear. Once pathologic fractures and skeletal distortion have made their appearance, it is a little late to correct the crippling effects of the disease and one can only hope to prevent further deterioration of function by proper treatment. When the clinician is faced with an obscure case of back and extremity pain, associated with systemic symptoms suggesting lassitude and weakness, he should do the necessary serum calcium, phosphate and phosphatase studies as well as, in equivocal cases, the study of the calcium-phosphorous balance in terms of urinary excretion. The prevention of the deformities by the prompt correction of hyperparathyroidism is well worth the added time and effort in making the diagnosis. In Paget's disease again it has been shown that pain in the back, hip and extremities is the initial symptom in at least one-third of the cases reported and it occurs as a major subsequent symptom in more than two-thirds of all cases. Gutman and Kasabach have reported[7] "the most common first manifestation of the disease was pain in the region of bone involvement usually in the legs, lower back or hips. This was a dull ache, most frequently not sharply localized, usually worse after exercise and relieved by rest. Occasionally, the pain would occur at night. Varying degrees of stiffness in the joints were commonly associated with pain. These complaints were generally considered 'rheumatic' or 'neuralgic' and often dismissed as due to 'old age'." The diagnosis in this condition of course depends upon the detection of significant changes on roentgen examination and the presence of marked elevation of the serum phosphatase in the presence of normal con-

centrations of serum calcium and phosphorous. As we all are aware, there is no specific treatment available for Paget's disease. The importance of its diagnosis to the clinician, however, is that he does not subject the patient needlessly to therapeutic procedures which, if not harmful, are useless and which will tend to discredit the physician's capabilities.

More Possibilities

It is essential in considering any source of back pain to realize the possibility of remote neoplasm. Metastatic bone disease of diverse origin and cellular structure may appear in many areas of the skeletal system. Particularly in early stages, this disease, in the spine, may be confused with diffuse osteoporotic changes. Even the presence of pathologic fractures is not distinguishing since they also occur in osteoporosis.

Another situation, less commonly understood, is that in which a patient has back pain, subsequently discovered to be from a retroperitoneal mass. This may be a lymphosarcoma, Hodgkins Disease, or even a hypernephroma. Many such individuals believe themselves to be in excellent health and complain of the onset of back pain following a minor injury in lifting, twisting, or athletic activities. If no roentgen changes are available to help make such a diagnosis, the clinician is forced to rely upon the history, the presence of associated lymphadenopathy elsewhere in the body and often the presence of a palpable spleen. In cases of obscure, deep seated low back pain, with apparently inconsequential trauma as the precipitating basis, the clinician should not hesitate to insist upon a biopsy of enlarged lymph nodes when present in the cervical, axillary or inguinal region as this probably will be the only definitive method of making a diagnosis.

A much more obscure situation exists when multiple myeloma is present. Such patients also may consider themselves in robust good health and will have the onset of acute back pain following relatively minor trauma. There is obviously no difficulty in establishing the diagnosis if the roentgen picture typical of myeloma is present, but often such back pain will occur before the typical punched out areas of the myeloma are detected in the bone and without the presence of pathologic fracture. In one instance which I have seen during the past year, a 48-year-old male engaged in golfing suddenly developed a pathologic fracture of the ninth left rib during the act of swinging through with his golf club. A radiologic examination revealed fracture of the rib which did not appear unusual. Approximately two weeks later, while stepping from his car to the curb, the patient experienced sudden severe pain in the mid-dorsal region of the spine. A roentgen examination revealed a minimal compression fracture with no other evidence of disease. The tentative diagnosis of multiple myeloma made at that time was confirmed by a sternal marrow aspiration smear. If the presence of multiple myeloma is suspected, not only should a sternal marrow examination be performed but, even when this examination is negative, further studies — including study of the marrow from the pelvic structures, particularly the ilium — must be undertaken. The urinary test for Bence-Jones protein is too equivocal to be made the basis for establishing or discrediting the diagnosis of myeloma. Carson and his co-workers[8] have pointed out that in myeloma the most prominent single symptom which forced the patient to seek medical aid was bone pain. It was not uncommon for patients to complain of pain in more than one area; the most frequent location was the back (70 per cent). Usually the lumbar area was affected, although the upper thoracic zones were frequently involved. Radiating and wandering pain was a prominent feature. Most of these patients had lumbar or sacral lesions with pain radiating to the hip and legs; some patients with dorsal vertebral lesions complained of pain radiating around the thorax. Many patients have bone pain for 6 to 24 months before a pathologic fracture pin points the diagnostic problem. There is reasonable evidence that prompt and early treatment of myeloma, before bone destruction has become widespread, may be of value in prolonging life and certainly is of help in diminishing the symptom of pain associated with the disease.

To avoid the possibility of making this an encyclopedic survey it is necessary to omit the vast subject of referred back pain on the basis of abdominopelvic disease, but it should be apparent that the examination of the patient with a complaint of back pain and his complete work-up is a much more weighty task than many of us have considered it in daily practice. It must include at least the following studies: a roentgen examination of the involved spinal segments, a rectal examination in the male and a pelvic examination in the female as well as a study of the peripheral vascular circulation, a precise analysis of the neurological factors present, the metabolic state of the skeletal system and the state of normalcy of the abdominopelvic structures. Without such careful study many difficult diagnostic situations masquerading as the obvious will be completely missed.

Conclusions

The symptom of low back pain is a treacherous one, subject to grave misinterpretation. The wise clinician will not be misled by a suggestive history of trauma which may prove to have been only tangentially related. He will remain alert to the nuances of the history, the physical examination and the laboratory studies required to rule out back pain of vascular, neoplastic, metabolic or abdominopelvic origin. The diagnostic challenge of back pain can be met only by thoughtful scrutiny and evaluation. The physiatrist is, by virtue of the broad sweep of his training and clinical interest, the clinician most capable of assessing the true meaning of back pain.

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Information relative to securing reprints of this study may be had by checking the Reader Service column on page iv of this issue.

The Way to a Man's heart is thru his chest!

—ANONYMOUS

Hospital-Centered Vocational Rehabilitation

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● A vocational rehabilitation unit, operating as an integral part of a department of physical medicine and rehabilitation in a suburban community hospital, is providing comprehensive rehabilitation, including the evaluation and training of patients in performing jobs in the hospital's operating departments. The project will operate for three years. In the first 14 months, 91 handicapped persons were referred. Fifty-one cases were closed, including 29 who went to work.

This is a preliminary report on a Vocational Rehabilitation Service started in September, 1958, in a 240 bed community hospital on Long Island. The VRS was established to demonstrate that vocational rehabilitation can be provided to any suburban community whose hospital has a department of physical medicine and rehabilitation. To the diagnostic, therapeutic and physical rehabilitation which such hospitals provide, the VRS has added vocational evaluation and training in the realistic setting of the hospital's operating departments, and intensive placement services, thus forming a unified, comprehensive vocational rehabilitation service within the hospital.

This paper was presented at a seminar sponsored by the
American Rehabilitation Foundation

Background

The Vocational Rehabilitation Service is operated by the Long Island Jewish Hospital and the New York State Chapter of the Arthritis and Rheumatism Foundation. The Hospital, which opened in 1954, provides comprehensive medical care and rehabilitation service to Queens, Nassau and Suffolk Counties on Long Island. The Chapter has cooperated since 1953 with the Institute for the Crippled and Disabled in operating the BACK TO WORK project, a vocational rehabilitation service for rheumatic disease patients.[1] Because the BACK TO WORK project is located in Manhattan, its services are not available to handicapped residents of Long Island. With the aid of a grant from the Office of Vocational Rehabilitation, the VRS was established as a three-year experiment and demonstration.

Organization

The VRS functions in and is integrated with the hospital's Department of Physical Medicine and Rehabilitation. It is staffed by two vocational counselors — one responsible for vocational evaluation, and the other for training and placement — and a secretary-registrar. The Hospital's Director of Physical Medicine and Rehabilitation and the Chapter's Medical Director supervise the VRS. The Hospital provides a medical and a psychiatric consultant and specialized medical, surgical and psychiatric services as required.

In addition to the evaluations provided by the Physical Medicine and other hospital Departments, the VRS emphasizes the importance of on-the-job evaluation of work skills, on-the-job training and

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intensive placement aid in vocational rehabilitation. Its testing and training programs are based on the fact that hospital operation includes many trades and skills almost all of which have direct counterparts in the regular labor market.

Method

The Division of Vocational Rehabilitation. By agreement, the Division of Vocational Rehabilitation purchases from the Hospital appropriate medical examinations, physical rehabilitation services and vocational evaluation, training and placement services for clients whom it refers to the VRS. The DVR also considers recommendations that it sponsor such services for clients referred to the VRS by other agencies.

Criteria and Referrals. The VRS accepts patients aged 16 to 65 who are not working because of a rheumatic disease or other physical illness or injury and who have actual or potential ability to use public transportation or otherwise get to and from a job. Referrals are made by the Hospital, by other hospitals and agencies, by private physicians or by the patients themselves. No charge is made to the patient for vocational rehabilitation.

Medical Data, Evaluation and Treatment. Medical data are provided by the referring source, supplemented as needed by general and special examinations furnished by the various hospital services. The Physical Medicine and Rehabilitation Department evaluates the patient's physical capacity and, when needed, prescribes and supervises treatment designed to increase his muscle strength, range of motion and capacity to perform the activities of daily living.

For vocational purposes, the patient's physical capacity is described in terms of his limitations in three major functions: (1) hand and arm activities; (2) standing, walking and climbing activities; and (3) lifting and carrying activities. Performance of these functions is classified as normal (including slightly restricted), moderately, or severely restricted. The classification is based on the evaluation of the patient's ability to perform and is unrelated to physical changes. For example, a patient with gross deformity may nonetheless perform one or another of these functions adequately.

Vocational Evaluation. Vocational capacity is assessed in two ways: a prevocational evaluation, conducted in the VRS office, is followed by an on-the-job evaluation performed in the hospital's operating and service departments. Both evaluations stress the performance of work tasks.

Prevocational Evaluation. This includes standard vocational aptitude tests such as reading, writing, arithmetic and work preference tests. In this stage the patient also is exposed to the performance of simple work tasks which are identical with parts of standard commercial or industrial jobs. These work tasks include, *inter alia,* mail sorting, alphabetizing and filing, order picking, simple arithmetic and bookkeeping, typing, gross and fine assembly, foot stapler and sewing machine operation, simple carpentry, etc.

A project counselor administers the tests and teaches the patient each work task, scoring his performance in terms of norms established for each test and task.

The patients' prevocational evaluation records are reviewed and their medical condition is discussed with the medical consultant and physiatrist so as to identify the patients ready for further evaluation in the more demanding setting of the hospital's operating departments.

In-Hospital Evaluation. Before accepting clients, the VRS staff discussed the project's evaluation and training program with the heads of the hospital's operating and service departments. The jobs regularly performed in these departments were studied to determine: (a) their physical surroundings and the demands these made on the employee; (b) the jobs' physical requirements — sitting, standing, reaching, lifting, grasping small objects, sorting, etc.; and (c) their requirements in terms of vocational skills. The jobs were analyzed into component work tasks which could be performed by project patients without interfering with the departments' work.

The department heads agreed to accept patients assigned by the project to practice these work tasks as the next stage in vocational evaluation. Table 1 lists

hospital departments accepting patients for in-hospital evaluation.

Initially, the patient practices these hospital work tasks in the VRS office where the counselor can observe him closely. Once the counselor has made sure that the patient can perform five or six different tasks at an adequate operating level the patient is assigned to perform the same tasks in the more realistic and demanding setting of the hospital department.

During in-hospital evaluation, the patients are supervised and their performance evaluated by the VRS counselor, in cooperation with the department heads.

Table 1: 21 Hospital Departments Accepting Patients for In-Hospital Evaluation

Accounting	Nursing Office
Cafeteria	Occupational Therapy Area
Central Supply	Out-Patient Dept. Office
General Stores	Pharmacy
Gift Shop	Print Shop
Housekeeping	Purchasing
Library	Sewing Room
Linen Room	Social Service Office
Maintenance	Switchboard
Mail Room	Visual Aids
Medical Records	

Initially, it was suggested that the in-hospital evaluation and training procedures might burden the department heads and interfere with regular hospital operations. These fears have not been realized. From the beginning, the needs and desires of each department were scrupulously consulted and the programs were started with cautious deliberation. The department heads have become sincerely interested and have cooperated cordially and effectively.[2]

Training

Patients who, upon completing in-hospital evaluation, are found to need training for new trades or refresher courses on former jobs are then assigned to a hospital department for five-hour-a-day courses lasting from two to twelve weeks. In these training courses, instruction is based on procedures grouped in units of increasing difficulty. The trainee is introduced to the simple tasks first; the complexity is increased as skill and familiarity are gained. A list of training courses is given in table 2.

The Relation of Training and Placement

In addition to the medical data, two vocational factors are weighed in helping a patient determine his job goal and the training program this entails: (1) his skills, aptitudes, experience and interests, and (2) the types of jobs available in his community.

In order to get offers of jobs suited to its clients' capacities the project counselors keep informed about the local labor market by correspondence, telephone and especially by field visits. In one six-month period, for example, the placement counselor visited 76 potential employers in the neighboring communities. On these visits the counselor described the project, asked the employer for notice of future job openings and carefully explained the project's policy of referring as job candidates only patients proved capable of performing the employer's job in competition with the non-disabled worker.[3] In order to make referrals appropriate to each firm, the counselor studied the physical and vocational demands of the firm's jobs during her visits and, when possible, obtained job samples. An assembly job donated by an electronics firm is currently used as a work task in prevocational evaluation.

Table 2: In-Hospital Training Courses

Machine Operation	Stock, Supply and Shipping	Service	Clerical and Accounting
Mimeograph Machine	Pharmacy Stock & Inventory Control	Porter-Cleaner	General Clerical
Multilith Machine	Linen Sorting, Storing, Distribution	Maintenance Man	Accounts Receivable
Addressograph Machine	Central Supply Aide	Cafeteria Counterman	Credits and Collection
NCR No. 2000 Bookkeeping Machine	Shipping and Receiving Mail Room	Dishwashing (Machine)	Cashier

The counselor tries to identify labor shortages as these develop so as to focus the project's training activities in those directions. When a need for pantograph operators was found, a pantograph was purchased so that the patients' ability to use this tool might be tested. Similarly, when a new accounting machine began to be installed by the hospital and by local firms, which then encountered difficulty in hiring personnel skilled in its use, the project developed a training program in operating this machine and has already placed two trained clients.

Results

The Fourteen-Month Experience. Pending the completion of this three-year demonstration, this paper presents data on the first 14 months, October 1958 through November 1959.

Ninety-one cases were referred to the VRS during this period. On December 1, 1959, 40 cases were active and 51 had been closed, including 29 who had gone to work.

As shown in table 3, the hospital itself referred 12 of the 51 cases, 22 being referred by the Division of Vocational Rehabilitation. Eight others were self-referred and nine were referred by a large city hospital, by private physicians and by the State Employment Service.

The Patient Group

Thirty-eight of the patients were males. As shown in table 4, 29 were aged 40 to 59 at intake, 18 were between 20 and 39; three were under 20 and one was over 60 years old.

The patients had a variety of diagnoses, as shown in table 5. The two major diagnostic groups were rheumatic diseases, and neurological disorders and cerebrovascular accidents. A number of patients had multiple diagnoses.

Table 3: Source of Referral — 51 Closed Cases

Referred by:	No.
Division of Vocational Rehabilitation	22
Long Island Jewish Hospital	12
Self	8
Queens General Hospital	5
Private Physicians	3
N. Y. State Employment Service	1
	51

Table 4: Ages of Patients — 51 Closed Cases

Ages	Total	Went to Work	Did not Go to Work
15-19 years	3	0	3
20-39 years	18	13	5
40-59 years	29	16	13
60 and over	1	0	1
	51	29	22

Limitation of Function

In 48 of the 51 cases, the limitations on the patients' ability to perform the three major functions (hand and arm; standing, walking and climbing; and lifting and carrying) were documented. Twenty-two patients had severe limitations in at least one major function and 21 were moderately limited. Five with slight or no physical limitations were perceptually or emotionally limited in their functional ability.

As shown in table 6, 12 of the 22 patients with severe handicaps and 13 of the 21 with moderate handicaps were placed at work. The difference between the two groups is too small to be significant.

Table 5: Diagnoses — 51 Closed Cases

Diagnoses	Total	Went to Work	Did not Go to Work
Rheumatic Diseases	16	7	9
Neurological Disorders and Cerebrovascular Accidents	16	10	6
Cardiac Diseases	8	6	2
Orthopedic Disabilities	4	4	0
Limited Vision or Hearing	4	1	3
Miscellaneous Conditions	3	1	2
	51	29	22

Table 6: Limitations on Patients' Ability to Function

Limitations	Total	Went to Work	Did not Go to Work
Physical Limitations — Severe	22	12	10
Moderate	21	13	8
Perceptual or Emotional Limitations	5	3	2
Data Incomplete	3	1	2
	51	29	22

The time during which patients were in contact with the Vocational Rehabilitation Service ranged from one month (in 11 cases) to 10 months in one case. Half the cases were closed within three months, the majority of these being patients who did not go to work. Of the 24 who remained in the program for over three months, 18 were placed on jobs.

Table 7: Duration of Contact with 51 Closed Cases

Duration	Total	Went to Work	Did not Go to Work
1- 3 months	27	11	16
4- 6 months	12	9	3
7-10 months	12	9	3
	51	29	22

As shown in table 8, 39 of the patients had worked before they came to the project and 12 young adults and housewives had had no significant employment experience.

Table 8: Previous Work Experience — 51 Closed Cases

Experience	Total	Went to Work	Did not Go to Work
With Prior Work Experience	39	26	13
Without Prior Work Experience	12	3	9
	51	29	22

While most of the formerly employed patients had worked on service or industrial jobs, as indicated in table 9, the variety of their prior employment was considerable, including law, manual labor, catering, mining, liquor sales and linotype operation among others.

Twenty-five patients had been out of work at least one year, including five who had been unemployed for at least five years. Of the six patients on Welfare at intake, three went to work.

Of the 29 patients who were placed on jobs, 17 made a major change in their occupation, as seen in table 10, such as

Table 9: Occupation Before Intake — 51 Closed Cases

Occupation	Total	Went to Work	Did not Go to Work
Service	16	11	5
Industrial	10	9	1
Clerical	7	4	3
Professional and semi-professional	3	2	1
Sales (2) and agriculture (1)	3	0	3
Students	7	3	4
Housewives	5	0	5
	51	29	22

the manual laborer who became a hospital central supply aide and the cook who became an accounting machine operator. Among the 12 patients who found work in the general area of their previous experience were several who nonethless made quite a change, like the welder who became an assembler.

As shown in table 10, 26 of the patients who were placed had had earlier work experience. Their old earnings had ranged from $40 to $100 a week, the median being $60. After vocational rehabilitation, however, their starting wages ranged from $40 to $78, the median being $50. As most of these patients were placed on jobs for which, though trained, they had no competitive experience, their lowered earning capacity was not surprising.

The 22 patients who did not go to work included four men who initially declined help because of the project's inaccessibility, their own misapprehension about its services or their preference for other sources of aid. Two of these now are believed to be working.

The records of the 18 patients who initially desired the project's help were studied to identify the factors which determined the closing of each case. These findings are summarized in table 11.

In nine cases (half this group) the character or severity of the patient's illness either prevented his entering or required his withdrawal from rehabilitation. Whenever possible, the project gave other assistance — it helped one patient apply for Aid to the Disabled and, in another case, attempted to obtain the sheltered work and psychiatric treatment required.

Seven patients were insufficiently motivated to go to work and withdrew from

Table 10: Occupation Before and After Rehabilitation

Before Rehabilitation		After Rehabilitation				
		Service	Industrial	Clerical	Professional and Semi-Professional	Sales
Service	11	5	3*	2	0	1
Industrial	9	4	4	0	1	0
Clerical	4	0	1	3	0	0
Professional and Semi-Professional	2	1	0	1	0	0
Students	3	1	1	1	0	0
Totals	29	11	9	7	1	1

*Includes one placed in a sheltered workshop.

some stage of rehabilitation. Sometimes the disinterest was expressed quickly, as when patients failed to come to appointments or to reply to repeated communications. In other cases, the patient maintained contact, participated in evaluation or even completed training to the project's satisfaction before withdrawing. But, in all cases, it became evident that, regardless of his physical condition, the patient lacked the motivation, the desire or the need to be self-supporting, which was necessary for him to go to work.

Finally, two young men withdrew for reasons difficult to classify. Subsequently, it was reported that one had suffered serious intercurrent disease, while the other was believed to be working.

Thus, of the 51 cases closed in this 14 month period, nine failed to go to work because of their disease and seven for insufficient motivation.

Conclusions

Study and discussion of several aspects of this project necessarily are postponed to a later date, for instance the determination of the patients' ability to tolerate competitive work for substantial periods; analysis of the workloads carried by the counselors in their vocational, training and placement activities; costs per patient; and so forth. However, the following preliminary conclusions seem justified:

Table 11: 22 Patients Who Did Not Go to Work

Declined Project's Help after First Interview		4
Desired Project's Help		18
Desired Project's Help — Reason Closed:		
Severity of Disease	9	
Insufficient Motivation	7	
Other	2	

(1) that the number of handicapped persons in a large suburb who need comprehensive rehabilitation is substantial;

(2) that a project of this type will receive case referrals from many sources, including the Division of Vocational Rehabilitation, the hospital, other community agencies and individuals;

(3) that using a hospital's operating departments to evaluate and train vocational rehabilitation clients is feasible administratively and effective vocationally;

(4) that the jobs normally encountered in hospital operation are the counterparts of jobs in demand by that community's labor market; and

(5) that a substantial proportion of the patients referred can be returned to competitive employment.

Summary

A vocational rehabilitation unit, operating as an integral part of a department of physical medicine and rehabilitation in a suburban community hospital, is providing comprehensive rehabilitation, including the evaluation and training of patients in performing jobs in the hospital's operating departments. The project will operate for three years. In the first 14 months, 91 handicapped persons were referred to it. Fifty-one cases were closed, including 29 who went to work.

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Information relative to securing reprints of this study may be had by checking the Reader Service column on page iv of this issue.

new apparatus

Hydrotherapy Unit

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● The plans, management, and usage of a custom built hydrotherapy unit at Children's Hospital, Columbus, Ohio, are discussed. This unit, consisting of three separate compartments and constructed of stainless steel, has proved to have many distinct advantages over conventional hydrotherapy units and the usual floor level therapeutic swimming pool.

Selected hydrotherapy procedures are valuable adjuncts in the treatment of many diseases and disabilities.[1-3] Not only are the buoyant, thermal and cleansing properties of water useful, but also the motivational impact on the disabled person, through the mastering of swimming skills and being able to participate in recreational water activities should not be underestimated.[3, 4]

In an effort to save money and space and to combine the more useful aspects of the small tank and the larger pool, one of the authors, in collaboration with a builder of custom made swimming pools, designed a new hydrotherapy unit. Following is a description plus a report of three years' experience in the use and maintenance of this unit at Children's Hospital, Columbus, Ohio.

Physical Plan

The plans for this hydrotherapy unit are pictured in figures 1, 2 and 3. Salient features are the raised sides, 36 inches above floor level, the three compartments, the moveable hydraulic lift with jacks at intervals around the unit, (fig. 4), and the special equipment in the unit including a stainless steel chair, table, headrest and adjustable, moveable parallel bars. The water depth may vary from a few inches to four and one-half feet. The depth of the larger compartment (No. 1 in fig. 1), varies from three feet to four and one-half feet.

The three compartments of this unit have separate temperature controls. Water temperature may be regulated to vary from tap water temperature (70-80 F.) to 110 F. Each compartment has a separate water inlet and outlet. These two features allow for separation of patients with skin diseases, open sores or bowel and bladder incontinence, and for use of a variety of water temperatures, cleansing solutions and brine baths.

The 36-inch height of the sides allows for easy transfer of severely disabled patients from a cart into the water. It also allows easy access of the therapist to the patients, so that single patients may be treated in any of the compartments without the therapist entering the water. This has been particularly helpful in the scheduling of adult outpatients who receive individual attention in compartment 1, since there is no loss of time by the therapist in preparing to enter and leave the water. The debilitating effect of being in warm water for long periods is avoided.

The capacity is 7,500 gallons which is circulated every four hours through one or all three compartments and is filtered through diatomaceous earth. The economy of water and heating costs is obvious. In addition, time is saved in filling, cleaning and draining compartments 2 and 3. Four inch drains are

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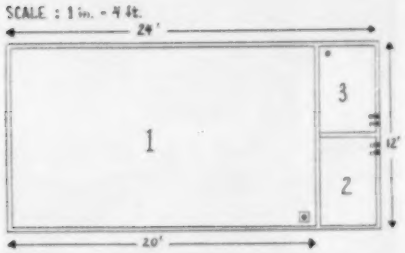

Fig. 1 — Top view of unit showing size and dimensions of three compartments. Compartment 2 has a depth of four and one-half feet; compartment 3, two feet.

SCALE : 1 in. = 4 ft.

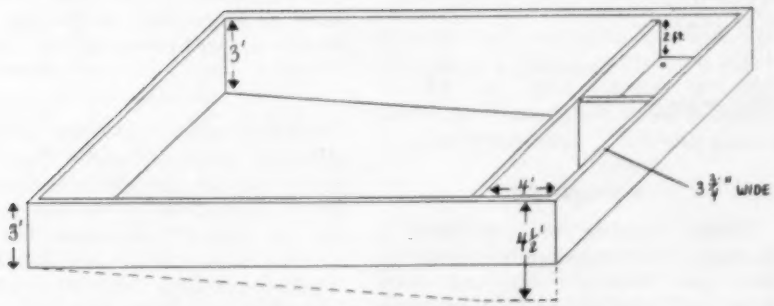

Fig. 2 — Side view of unit showing relative dimensions of the compartments.

Fig. 3 — Overall view of the unit.

Fig. 4 — Use of hydraulic lift for ease in putting patient into the unit.

used. Rapid filling is provided by two means: one and three-fourths inch inlets, and special four inch shunts controlled by valves, which connect compartment 1 with each of the smaller compartments. A record of the filling and draining time is as follows:

	Compartment 2	Compartment 3
Filling time to treatment level	4 minutes	1½ minutes
Draining time	7½ minutes	6 minutes

Management

Weekly cleaning of the filters is necessary. The procedure is to drain the filter tank, rinse the sides and nylon filters, refill and add new diatomaceous earth. This entire operation requires about 30 minutes.

The bacteriolytic agent used is bromine in preference to chlorine, because it is less volatile at warm water temperatures (average temperature of compartments: 1, 92 F., 2 and 3, 95 F. to 100 F.). Bromine must be added twice daily. The bromine concentration should be held at a minimum of 0.6 parts per million and a maximum of 2.0 parts per million. With this regimen the water has remained crystal clear. Bacterial cultures of water samples taken 20 hours after patient usage have shown no growth. The *p*H usually remains in a range of 7.6 to 7.8. In actual practice we have found that a bromine concentration as high as 3.0 parts per million and a *p*H of 8.0 are tolerated well by both patients and therapists.

The unit is constructed entirely of stainless steel. This gives a favorable appearance, provides the best possible sanitation, and needs little maintenance. Despite stainless steel's high initial cost,* it does not seem excessive when one considers its adaptability in this unit and the low cost of maintenance.

Uses

This hydrotherapy unit has proven as adaptable as was hoped. The large 12 x 20 foot compartment is excellent for all types of pool therapy. Several patients may be treated concurrently by one therapist, assisted by an attendant. Non-swimmers can wear vest-type kapok life jackets when not receiving individual attention. These jackets are used for expediting treatment procedures and are not used to teach swimming skills. Exercises may be given on floats or on the submerged treatment table. Either parallel bar may be unhooked to allow maximum maneuverability in and out of the bars.

Compartments 2 and 3 are adaptable to most of the uses of the standard Hubbard Tank. A portable agitator unit is used. Compartment 2, being deeper, is useful for walking patients.

Among patients treated effectively in this unit are those with orthopedic conditions, including post-fractures, muscle transplants and hip surgery, numerous neurologic and neurosurgical conditions, including poliomyelitis, cord injury and

*Less expensive laminated stainless steel is now available.

disease, cerebral palsy, and brain injury, amputations, arthritis, burns and other skin lesions. Polio patients with respiratory involvement are treated, even though they have an open tracheotomy or are unable to be free of respiratory aid (fig. 5). The use of oral positive pressure from a hand bellows or a grounded electrical unit and a battery operated aspirator are all that is required for complete safety in this respect.

In practice we have used the pool for the following procedures: heat before and during flexibility exercises; muscle re-education; gravity eliminated exercise; early standing and ambulation; active underwater exercise to increase the range of motion of post-operative, traumatized and arthritic joints, and the cleansing of burns, decubiti and a variety of skin conditions usually with the addition of detergent and agitation to the water. Treatment time averages about 30 minutes in the water for each patient. An average of between 15 and 25 patients are treated in the unit daily.

Group recreational activities and the teaching of water skills have been stimulating and rewarding to the patients, to their parents or relatives, and to the staff. Special swimming classes for community cerebral palsy groups have proved to be an excellent public relation experience. Handicapped youngsters have learned to swim and have gained much in social and recreational values[3] with resultant good will for the hospital and the Division of Physical Medicine and Rehabilitation.

As expected, some minor improvements could be added to this first unit. A larger unit would allow greater numbers to be treated at one time. If longer, the slanted bottom of compartment 1 would have less incline, although this has not been a serious problem. Standing space for the therapist, between compartments 2 and 3, would allow access to the patient from three sides, making exercises more convenient. Other improvements would include concealing the water inlets of compartments 2 and 3 within the walls. The ceiling should be higher than an ordinary room since the pool is elevated. A low ceiling over any pool tends to restrict recreational activities. Also, it would be wise to have the light source well protected and flush with the ceiling. Underwater lights would be helpful in providing better observation of underwater therapy. Adequate soundproofing of the room is strongly urged. A method of controlling the humidity is important. Adequate and convenient dressing room space, for both men and women, and two toilet facilities within the unit, is desirable.

Summary

The plans, management, and usage of a custom built hydrotherapy unit at Children's Hospital, Columbus, Ohio, are discussed. This unit, consisting of three separate compartments and constructed of stainless steel, has proved to have many distinct advantages over conventional hydrotherapy units and the usual floor level therapeutic swimming pool.

Fig. 5 — Respiratory poliomyelitis patient treated in the unit with respiratory aid from oral positive pressure.

References

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3. Covalt, Nila Kirkpatrick: Swimming by the Handicapped. Arch. Phys. Med. 39:377 (June) 1958.
4. Swimming for the Handicapped, Instructor's Manual No. 1092. The American National Red Cross. (Feb.) 1957.

Information relative to securing reprints of this study may be had by checking the Reader Service column on page iv of this issue.

NOTICE TO CONGRESS MEMBERS

Please take notice that Section 3, Chapter 1, "Dues and Special Assessments" of the By-Laws as amended and published in the July, 1960 issue of the ARCHIVES reads in part as follows: *"The annual dues which shall be due January 1 shall be in such sum as is set by the Board of Governors."* At the recent Board meeting held in Washington, the following applies:

Dues for 1961 —

Active Members .....Thirty-five Dollars ($35.00)

Associate Members .....Twenty-five Dollars ($25.00)

Affiliate Members .....Seventeen Dollars and fifty cents ($17.50)
(or one-half of annual dues required of active members)

An explanatory letter is being sent to each member by the President.

editorial

Use and Abuse of Services of the Executive Office

In recent years, there has been a marked increase in requests by various committees of the American Congress/American Academy of Physical Medicine and Rehabilitation for secretarial and clerical assistance from the Executive Office in carrying out projects originating in these committees.

Accordingly, the Board of Governors of the American Congress of Physical Medicine and Rehabilitation decided on the following action: that a notice be prepared and published in the ARCHIVES reminding our members that the acceptance of an appointment, either as chairman or as a member of a committee, includes acceptance of responsibility by the individual for provision of whatever clerical assistance or secretarial services that are deemed necessary. In the future, requests for such assistance must not be made of the Executive Office staff. If funds are necessary for carrying out the recommendations of a committee, a request must first be submitted to and approved by the Board of Governors of the respective organization before any money can be appropriated since such committee functions are not budgeted items.

The cooperation of all committee members, particularly of the committee chairmen, is hereby respectfully requested.

— Paul A. Nelson, M.D., *Chairman*
Editorial Board
Archives of Physical Medicine and Rehabilitation

book reviews

KINESIOLOGY AND APPLIED ANATOMY. The Science of Human Movement. By *Philip J. Rasch,* Ph.D., and *Roger K. Burke,* Ph.D. Cloth. Price, $7.50. Pp. 456, with 226 illustrations. Lea & Febiger, Washington Sq., Philadelphia 6, 1959.

This is one of several new books which have come out recently on the subjects of functional anatomy, applied anatomy, kinesiology, and plain anatomy—in various combinations. The authors take an interesting and unconventional approach. Their chapter on the history of kinesiology is good reading, undoubtedly authoritative, and interesting. The sections on basic material of microstructure and biochemistry of muscle contraction are good as far as they go; they leave out much up-to-date material such as that in the recent monographs by Eccles and by Szent-Gyorgyi. Reference to the small motor system, for example, was not included.

The main treatment of anatomy suffers from dryness and from repetitive display of illustrations taken from Gray's Anatomy. If there are any inaccuracies in Gray's Anatomy they would surely be perpetuated by the method of repeated copying. The final section on kinesiology of sports and posture is interesting and well organized for those interested. *(Sedgwick Mead, M.D.)*

ELONGATION TREATMENT OF LOW BACK PAIN. By *George H. Hassard,* M.D., and *Charles L. Redds,* B.S., P.T. Cloth. Price, $4.50. Pp. 78, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1960.

Dr. Hassard and Mr. Redds were asked by the Owens-Illinois Glass Company to take a positive approach and direct any action of any kind to solve the serious problem of low back pain. Previous to the writing of this book the program had been in effect for 15 months. Compensation statistics revealed that in the 15 months prior to beginning the program $20,969.91 was paid out and 1,203 man-days were lost due to low back troubles. Since its inception $2,448.88 has been paid out and 119 man days lost.

The authors make prevention the basis for their treatment in this industrial setting. Employees are trained in methods of lifting and programs of exercise are given which will cause elongation of fibrous collagen tissues for release of fibrous contracture and hence alleviation of many of the stubborn backaches and peripheral nerve symptoms seen in practice. Connective tissue elongative loosening can be capably administered by any registered nurse. This book is written primarily for therapists, nurses, coaches, industrialists and educators, as well as physicians. Anatomy, physiology and body mechanics are explained in very simple terms and the illustrations almost explain the story without the text. The importance of good mobility is well known, yet the opportunity for prevention of acute conditions by the principles outlined are seldom applied.

This book should be in the hands of all individuals who are in any way responsible for the health of employees in industry. *(Frances Baker, M.D.)*

BACK PAIN. Diagnosis and Treatment Using Manipulative Techniques. By *John McM. Mennell,* M.D. Cloth. Price, $9.50. Pp. 226, with illustrations. Little, Brown and Company, 34 Beacon St., Boston 6, 1960.

It is not strange that Dr. Mennell should take such a keen interest in the treatment of conditions of joints by means of manipulation. His father has given this his deepest thought and consideration over many, many years and the author has made this problem the basis for most careful study. The book is well-planned to describe methods of diagnosis and of treatment. As nearly as one can, methods of examination and treatment are described, though the author makes it very clear that demonstration is of far greater value. Learning such technics from the printed page is very difficult. This book should be a reference and even a textbook from which students may learn proper methods for obtaining information by the history and by particular manipulative technics in making the diagnosis. Each movement of joint play is elicited by moving one articular surface on the other, which is immobilized; this is one of the cardinal rules of manipulative technic, be it a movement of clinical examination or a therapeutic manipulation. The various reasons for joint dysfunction are discussed in detail: (1) loss of function in a synovial joint resulting from trauma (joint lock, subluxation or total dislocation); (2) trauma resulting in immo-

bilization of joints in plaster as part of fracture treatment, immobilization of the joint as the after-treatment of simple dislocation, and the presence of intra-articular adhesions following the resolution of hemarthrosis or, if the joint has been infected, pyarthrosis; (3) dysfunction due to disuse, poor posture, congenital anomalies and pre-existing disease. The author considers that manipulative therapy is more efficacious in the primary treatment of these conditions than is the routine program of exercise or injection or heat or combinations of these. The movements of examination and therapeutic application are identical, except that in examination considerable gentleness is employed in performing each movement and each movement is stopped as soon as the patient complains of pain; in therapeutic manipulation the movement is repeated to the point of pain and then a springing thrust is added which carries the movement through the point of pain to its normal limit. The importance of a thorough knowledge of normal joint play is emphasized and described for all joints of the spine. A very thorough description is given of all tests required for localization of the pathology. Therapeutic manipulative procedures are defined and illustrated.

Following manipulative procedures Dr. Mennell emphasizes the importance of rest with movement. He advises a firm mattress and is opposed to the use of bed-boards or any fixed positions which traction might cause. He advises muscle setting exercises and passive exercises. This is rather surprising considering the type of condition which he is treating. He discusses fibrositis, contractures with the poor posture, anomalies, spondylitis. It is his feeling that the intervertebral disc and the ruptured nucleus pulposus is overemphasized. Spinal sprains due to the whiplash type of injury are discussed, and the very great importance of early treatment, with rest—since whether true joint dysfunction requiring manipulation is present or not, a synovitis is almost sure to be present and require treatment.

Whether one is entirely in agreement with Dr. Mennell or not, this book is well and logically written. Functional anatomy is explained and is the basis for the diagnosis and the treatment. Anyone treating conditions of the back should give it careful study. *(Frances Baker, M.D.)*

THE NATURAL HISTORY OF CEREBRAL PALSY. By *Bronson Crothers,* M.D., and *Richmond S. Paine,* M.D. Cloth. Price, $6.75. Pp. 299, with illustrations. Harvard University Press, Cambridge, 38, Mass., 1959.

This volume represents the results of a comprehensive review of cases originally diagnosed as cerebral palsy at the Children's Hospital and Medical Center, Boston, during the past several decades. There is also a review of the literature pertinent to each of the major categories discussed, prior to presentation of the authors' data.

There are eighteen chapters in all, beginning with a description of the investigative plan, followed by considerations of growth and development, examination of the child with cerebral palsy, comments on cerebral palsy clinics as they usually exist throughout the country, classification of cerebral palsy, discussion of several specific types of cerebral palsy, and concluding chapters devoted to intelligence, life expectancy and employability, treatment of motor disabilities, education, emotional status, the effect of cerebral palsy on the family. The last chapter is devoted to general conclusions.

The format of this reference work is excellent, the type large, and the chapters are logically sub-divided, permitting easy and comfortable reading. Many charts and tables are used to supplement the text and each is clearly defined and fulfills its purpose. The references are large in number but quite well selected, and the index is an important and valuable portion of a work such as this.

To attempt to select highlights for comment or criticism would be entirely inappropriate for this volume. Each paragraph contains a wealth of information, whether in reviewing the literature or setting down the results of the authors' survey. As one might expect from pursuing the chapter titles alone, nearly every element of cerebral palsy is touched upon, and while naturally not in detail, nevertheless presents extremely valuable material. The excellent reference list supplies the source of additional information for the individual reader if desired. Throughout the entire book, this reviewer was impressed with a much needed and refreshing attitude toward cerebral palsy, and it seems that no other authorities are better prepared, following the exhaustive case review, to present this view than these authors. It is simply one of a common sense, logical approach to the overall management of the cerebral palsy victim, recognizing all specialties and ancillary medical groups, but urging a careful utilization of each after judicious consideration.

This book is recommended without reservation to all physicians and surgeons who participate in the management of cerebral palsy. While not all may agree with some of the conclusions, all will certainly profit by the contents. *(F. E. V.)*

LEHRBUCH DER KRANKENGYMNASTIK. By Prof. Dr. *K. Lindemann;* Dr. *H. Teirich-Leube,* and Dr. *W. Heipertz.* Cloth. Price, 32 D.M. Pp. 328. Georg Thieme Verlag, 14a Stuttgart, Herdweg 63, Germany, 1959.

A prospectus accompanying this volume indicates that it is the first of a series of four

publications to be devoted to exercises for the sick and the handicapped. The second volume is to deal with human anatomy and particularly with nerves and blood vessels; the third, with therapeutic exercise in general surgery, traumatic surgery, orthopedics, physical medicine, gynecology, and obstetrics; the fourth, with therapeutic exercise in internal medicine, neurology, psychiatry, and pediatrics and with vocational and medicolegal aspects of the subject.

In his introduction to the present volume, Lindemann defines the purpose of therapeutic exercise as the application of methodical exercise-movements and physical measures to aid in preventing, correcting, or ameliorating disease conditions in man. He notes that the central society of German corrective therapists, the "Krankengymnastik e. V." has been recognized as an affiliate of the World Federation for Physical Therapy. The following section reviews, within the space of 91 pages, the entire field of physiology as seen by the corrective therapist; it is difficult reading because in such cramped space the author is often obliged to be content with allusions instead of explanations. The following 38 pages give a similar synopsis of pathology, especially diseases of the musculoskeletal system. Brief sections on first aid and bandaging and on the history of gymnastics are followed by substantial sections of 53 pages on general principles of therapeutic exercise, 35 pages on technics, 9 pages on exercises in water, and 52 pages on massage. There are bibliographies and a subject index. The book is beautifully illustrated, and the many diagrams and photographs help to overcome the language barrier. *(F. T. J., M.D.)*

BESCHAFTIGUNGSTHERAPIE. Einfuhrung und Grundlagen. By Dr. *G. Jentschura.* Cloth. Price, 45 D.M. Pp. 299, with illustrations. Georg Thieme Verlag, 14a Stuttgart, Herdweg 63, Germany, 1959.

The preface by K. Lindemann notes that the content of training courses for occupational therapists has acquired substance as the result of an action of the government of lower Saxony whereby a state-recognized school was established in Hanover. This was followed by the building of schools in Berlin and Munich. The present book is a response to the need for teaching materials.

The first section of 53 pages, contributed by Eva-Maria Rudel, is a well-illustrated description of many of the activities usually seen in departments of occupational therapy, but closes with additional suggestions for facilitating an invalid's work at home and increasing his capacity for self-care. The author's own contribution is an 82-page chapter on occupational therapy applied in orthopedic and traumatic surgery, including arthritis, paralyses, amputations, and related handicaps. Other authors have contributed chapters on the functional anatomy of various activities and the application of occupational therapy in tuberculosis and in psychiatry. This last section suffers from a sort of lofty vagueness, and the single page devoted to music, for example, scarcely hints at the amount of money now being spent for acoustical equipment in hospitals and the amount of practical experience that has accumulated. The underlying philosophy, however, is well presented. In general the book is attractive and full of concrete suggestions. It closes with a good bibliography, a list of manufacturers of apparatus and materials, and a subject index. *(Frederick T. Jung, M.D.)*

THE STORY OF DISSECTION. By *Jack Kevorkian,* M.D. Cloth. Price, $3.75. Pp. 80, with illustrations. Philosophical Library, Inc., 15 E. 40th St., New York 16, 1959.

This monograph reviews the history of the practice of the dissection of the human body for either anatomic or pathologic study. The author points out the chronologic association of the acceptability of this practice with periods of general enlightenment and intellectual progress. The book is illustrated with 16 pictures of great anatomists, pathologists, and physicians of the past. Well written and nicely produced, it provides an interesting background for the attitudes and practices of dissection in this day. *(G. Keith Stillwell, M.D.)*

ARTHRITIS: Medical Treatment and Home Care. By *John H. Bland,* M.D. Cloth. Price, $4.95. Pp. 208, with illustrations. The Macmillan Company, 60 Fifth Ave., New York 11, 1960.

Dr. Bland has written this book primarily for the patient with arthritis. The language is easy to understand and yet scientific in content. He discusses the incidence and economic importance of arthritis, and compares its prevalence with other chronic diseases.

Dr. Bland is Associate Professor of Clinical Medicine, University of Vermont College of Medicine. He has been interested in arthritis for many years and has come to recognize the need for educating the patient, not only in what medicine can do for him, but particularly in what he can do for himself and how the family can take an active part in the rehabilitation of the patient.

The various forms of arthritis are described, not with the purpose of permitting the patient to make a diagnosis, but rather that the patient may understand to a certain extent the big problem of the arthritides. He explains that research is constantly in progress. He describes the various forms of treatment which have been tried and discarded over the years, and the present forms of medication with their values and with their limitations.

Medication, however, plays a minor part in this book as compared with the great importance of rest and physical therapy, particularly as regards proper exercise. Necessary splinting and necessary orthopedic surgery have their place, but more than half of the book is devoted to the great need for rest, the very careful supervision of the physical therapeutic program, the very careful training which both the patient and members of his family must have in order to carry on a constant fight against deformity, a constant attempt to prevent atrophy, to improve the general physiology of the patient as a whole.

The illustrations are most interesting and eye-catching. These are by George Daly. They are simple and informative, having to do with posture in many positions. Self-help devices are mentioned and well illustrated. An appendix describes the major organizations devoted to education, research and treatment throughout the country.

This is an outstanding book describing arthritis in such a manner as to make the patient play an active part in his own rehabilitation. The physician can read this book gathering much information in the over-all care of the patient with rheumatism. Physicians can be most happy to recommend the book to their patients. *(Frances Baker, M.D.)*

COLOR ATLAS AND MANAGEMENT OF VASCULAR DISEASE. By *William T. Foley*, M.D., and *Irving S. Wright*, M.D. Cloth. Price, $18.00. Pp. 170, with colored illustrations. Appleton-Century-Crofts, Inc., 35 W. 32nd St., New York 1, 1959.

The authors are to be congratulated for summarizing their extensive experience in the field of peripheral vascular diseases in such concise and clear-cut visual form. All categories of peripheral vascular diseases are covered and illustrated by beautifully reproduced color photographs of selected cases. The visual demonstration of these diseases adds greatly to the understanding of the basic diagnostic features of vascular disease.

Management of the various diseases is clearly and concisely outlined for quick reference. Conservative measures are stressed.

One could not agree with the statement that in the case of sudden embolization surgery must be employed within eight hours. The experience of many indicates that a successful embolectomy can be carried out up to 72 hours.

In the opinion of the reviewer the importance of angiography and arterial grafting is not adequately covered. This book is, however, an excellent addition to the several books now covering the field of peripheral vascular disease and will be of great help not only to specialists in the field, but to students and general practitioners as well.

RECREATION ACTIVITIES FOR THE HANDICAPPED. By *Frederick M. Chapman*. Cloth, Price, $5.75. Pp. 309, with illustrations. The Ronald Press Company, 15 East 26th St., New York 10, 1960.

This book fufills a long recognized need. Recreation as a therapeutic, and therefore, at times a medically prescribed activity, is a recognized phase of total rehabilitation. It can be of great value in hospitals, as well as in community programs, and for the homebound. Furthermore, active participation whenever possible, rather than passive audio-visual passive (non-participating) programs only, such as watching TV, movies, or plays, or listening to concerts, is unobtrusively stressed, even though audio-visual activities are one of the ten groups of activities described.

This is a very practical book which presents specific details, instructions and patterns for a well-rounded activity program for handicapped persons of all ages and with all types of handicaps. It can be of assistance to physicians to give them a better understanding of prescribing recreational activities to their patients, to teachers working with restricted groups, to families, and to volunteers offering assistance in recreational activities in hospitals or other institutions or in community programs. While the use of volunteers in such programs is not particularly stressed, they will find it a valuable textbook and one which will answer many of the questions that volunteers who work with the handicapped so frequently ask.

The book is divided into two parts, followed by four excellent appendixes, an index of diagnostic groups, and a general index. Part I is titled "Program Leadership." The handicapped in the community are defined as "any person whose vocational and daily activities are restricted or limited." An insight into various types of, and reasons for, behavior problems is presented, with suggestions as to how these problems may be met in various situations. The reasons for recreation are discussed. A design for program planning, program content and leadership is presented. Six diagnostic groups for program planning are described. The six groups are: The Aged, Children, General Medical and Surgical Patients, the Mentally Retarded, Neuropsychiatric and Tubercular.

Part II gives specific descriptions of activities, divided into ten program areas. These areas of activities are: Arts and Crafts, Audio-Visual, Dance, Dramatics, Hobbies and Special Interests, Musical, Nature and Outing, Social Recreation, Special Events and Sports and Games. The diagnostic groups for each activity are specified for each program area. Of over 250 activities, an exact description of each is given, with instructions or diagrams for use, description of equipment required, or of other procedures or variations.

These activities are so well described that this section can be used as a complete text or reference book for practical application. Material has been assembled, and in such clear and concise form, that can only be found elsewhere or piecemeal in numerous other books, in individual volumes devoted individually to each of the 10 activity areas in most instances.

Of the four appendixes, the first describes methods of finding the particular interests of the individual person. The second is a recreation calendar, of particular value for special events. Appendix 3 covers a wide list of supplemental references to supplement the ten program areas. Appendix 4 names firms and organizations for reference. These include organizations directly concerned with specific program areas or classification of handicapped, to the names and addresses of firms who supply specific equipment.

The INDEX BY DIAGNOSTIC GROUPS lists those activities of the 250 which are particularly applicable to each of the six diagnostic groups. The activity and page reference where it is described is listed for each activity under each group. The general index is complete.

The entire field of activities that can be performed by all types of handicapped persons has been adequately covered in a well-rounded, but concise manner. The material is easily understood by any interested person, is easy reading, and is a most practical text as well as reference book. It can be used by anyone who is engaged, or desirous of planning on engaging in a recreation (activity) program for people of any age and with any kind of handicap, be it physical or mental. *(Nila Kirkpatrick Covalt, M.D.)*

ESSENTIALS OF HEALTHIER LIVING. By *Justus J. Schifferes,* Ph.D. Cloth. Price, $5.50. Pp. 335, with illustrations. John Wiley & Sons, Inc., 440 Fourth Ave., New York, 1960.

Dr. Schifferes is a health educator who has served as a teacher, editor and publisher. "Essentials of Healthier Living" is a second edition of "Healthier Living" which was published in 1954. It is really a new text that is shorter than its predecessor.

The author states in his preface that this book was developed and written in accordance with the wishes expressed by 250 college instructors from all parts of the United States. The book has wide scope and emphasizes fundamentals of many disciplines to discuss personal and community health. The author attempts to meet the needs and alert the interests of college students in the development of healthful habits based on latest and best factual information. There is a splendid orientation on the general subject matter and the text is then divided into the areas of personal health, education for family living, mental health, personal and community health hazards and community health. The book has easily read type and numerous excellent photographs and drawings, some of which are in color.

The book represents skillful effort in reducing much information to a format that is well balanced and very well written. The teaching aids that are part of the text are excellent. The needs of college students in health education are handled in a superior manner in this textbook. *(Charles D. Shields, M.D.)*

BIOCHEMICAL PREPARATIONS. Vol. 7. Edited by *Henry A. Lardy.* Cloth. Price, $5.25. Pp. 102. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, 1960.

This volume continues in the same form and style of the earlier volumes of this useful series. The practice of having a cumulative subject index to all preparations given in previous volumes has been continued as well as listing of compounds of biochemical interest presented in "Organic Syntheses."

Preparations are given for the following: N-acetylneuraminic acid, chemical and enzymatic synthesis of adenosine di- and triphosphates containing p^{32}, B-aminoisobutyric acid, carbamyl phosphate, (−) — carnitine chloride, cerebrosides, coproporphyrin III tetramethyl ester, 6-deoxy-6-fluoro-D-glucose, dihydroxyacetone phosphate, flavin adenine dinucleotide, D-fructose 1-phosphate (barium salt), 3-hydroxy-L-kynurenine, hydroxypyruvic acid phosphate, methylmalonic semialdehyde, potassium dihydrogen L_s (+) -isocitrate, S-palmityl coenzyme A, stearic acid, methyl stearate, stigmasterol, tetrahydrofolic acid.

This volume, like the first six of this series, will be extremely valuable to all workers in the many fields of biological research by providing reliable methods for the preparation of compounds of biological interest. Methods are also given for establishing the purity of the final product, an invaluable chemical procedure often overlooked in biological research. This book will probably have little usefulness to people not actively engaged in research since it presents only preparative methods for the above compounds. Thus, it probably would not serve as a reference aid for teachers or physicians. *(Robert R. Smeby, Ph.D.)*

ANATOMY: Regional and Applied. 2nd Edition. By *R. J. Last.* Cloth. Price, $15.00. Pp. 741, with illustrations. Little, Brown & Company, 34 Beacon St., Boston 6, 1959.

It is a great pleasure to receive and review this textbook, although the reviewer cannot pretend to have read it exhaustively. The arrangement of the material is by regions, favoring the needs of the student working with dissections or museum specimens; favoring also modern concepts of pedagogy.

The treatment is directive rather than encyclopedic; some readers might feel that the author has skimped on illustrations. However, it is not possible to present both a treatise and an atlas in the same volume. The drawings, some in color, and the photographs are of excellent quality. The text is as interesting as anatomical descriptions can expect to be, and are illuminated by the author's manifest competence in both embryology and comparative anatomy.

American readers will need to remember British deviations from the Berne Convention. (A 1960 New York convention will again tackle the problem of international anatomical nomenclature.) Those who have become familiar with and confident in sketching J. J. Keegan's plan of dermatome mapping will disagree with the author's presentation of older schemes.

In general the reader finds little with which to cavil and much to admire in this excellent textbook of anatomy. It is recommended. *(Sedgwick Mead, M.D.)*

1959 INSTRUCTIONAL COURSE LECTURES OF AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS. Edited by *Fred C. Reynolds*, M.D. Cloth. Price, $16.00. Pp. 320, with illustrations. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1959.

Another noteworthy volume has been added to an already illustrious series. The material covered in this volume is of particular interest to the physiatrist. It is divided into seven parts: (1) symposium on injuries to athletes, (2) the hand, (3) the foot, (4) the knee, (5) the spine, (6) unequal extremities, osteomyelitis, electromyography in orthopedic surgery and (7) fractures.

In general, the papers are didactic in nature and well supplied with good illustrations. The emphasis is primarily on orthopedic surgery in relation to the subjects listed.

It is of interest to see that the symposium on injuries to athletes was given the opening position in this book. All the physicians participating presented sound approaches to the various injuries occurring in sports. Throughout this section, emphasis was placed on prevention of injuries and adequate and careful rehabilitation following injuries.

J. V. Luck presented a new concept relative to the pathogenesis and surgical management of Dupuytren's contracture. D. C. Riordan gave a most instructive paper on the various approaches to surgery of the paralytic hand by means of tendon transplants. The problems of the industrial low-back cripple were presented. An extensive instructive article on principles and treatment of scoliosis is well presented and the principles of mobilization and fusion are discussed in detail.

Of particular interest is the final symposium on the treatment of fresh fractures of the femoral neck with a prosthesis. Seven orthopedic surgeons took part in this symposium and, although varying points of view were presented, in general it appeared that this method of treating these fractures is gaining in favor in selected cases. It was interesting to note that only one member of the panel gave adequate emphasis to the importance of the exercise program in the postoperative phase of the patient's care.

This book should provide a good basic reference work for libraries in departments of physical medicine and rehabilitation. It would be of particular value to residents and fellows in physical medicine and rehabilitation who need a good up-to-date working knowledge of orthopedic surgery and of orthopedic surgical concepts and procedures. *(Gordon M. Martin, M.D.)*

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survey of selected literature

A. M. A. ARCHIVES OF NEUROLOGY. *Vol. 2, June 1960.*

◇ **Neurogenic Muscular Atrophy Simulating Muscular Dystrophy. K. R. Magee, and R. N. DeJong. pp. 677-682.**

The authors present three cases of neurogenic muscular atrophy very similar to, if not, hereditary proximal spinal muscular atrophy. All three are from the same family and include the 40 year-old mother, a six year-old son, and a three year-old daughter. They deviate from the usual cases of hereditary proximal spinal muscular atrophy as described by Kugelberg, Welander and Wohlfart in several ways. The hereditary transmission seems to be a simple dominant, the deep tendon reflexes are not diminished, and the mother denies progression for a period of 37 years. All three were diagnosed incorrectly as progressive muscular dystrophy. The importance of this error in the more grave prognosis of muscular dystrophy is obvious and the value of muscle biopsy and electromyography in diagnosis is stressed. The findings reported in hereditary proximal muscular atrophy include (1) onset of weakness in childhood or adolescence; (2) atrophy, hyporeflexia, and weakness predominantly affecting the proximal muscles; (3) very slow progression; (4) hereditary transmission as a non-sex-linked recessive, and (5) confirmation of the degenerative lower motor neuron disease by muscle biopsy and/or electromyography.

Myoclonus. *Aigner, R. B., and D. W. Mulder. p. 600.*

Neurologic amyotrophy of the lower limbs. *Jolly, S. S., and A. Singh. p. 683.*

A. M. A. ARCHIVES OF PATHOLOGY. *Vol. 69, June 1960.*

◇ **Myocardial Infarction in Women. F. Goodale; W. A. Thomas, and R. M. O'Neal. pp. 599-604.**

Recent autopsy data obtained from three large, widely separated medical centers shows the incidence of fatal acute myocardial infarction is nearly identical in men and women over 50 years of age, in contrast to the traditionally prevailing opinion of up to a six to one preponderance of men over women with this disease. The cases include nearly 25 per cent of more than 13,000 autopsies.

However the preponderance of men over women was twelve to one in entirely different kind of data collected from a group of patients under the age of 50, discharged alive from Barnes Hospital with the diagnosis of acute myocardial infarction. This excessive preponderance of men is ascribed to the greater clinical suspicion of the disease in men, whereas the opinion is set forth that many women under the age of fifty have not had the benefit of an accurate clinical diagnosis. The presence of more discrete hormonal differences or analogous factors in this younger group of patients was not mentioned as a possible or partial explanation for this significantly different sex incidence.

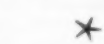
◇ **Occurrence of Osteoporosis in Mice with Muscular Dystrophy. V. Brat; R. Shull; R. B. Alfin-Slater, and B. H. Ershoff. pp. 649-653.**

Osteoporosis, premature closure of the epiphyses and loss of trabeculation were observed in the tibiae of 30 dystrophic mice from a mutant strain of "Mice 129", as compared to negative findings in normal litter mates, when examined at 12, 16, and 20 weeks of age. Other bones in these dystrophic mice were normal.

The cause of these osteoporotic and other changes remains unknown, although bone atrophy from disuse was mentioned as a possible cause in the 16 and 20 week old mice. In the 12 week old mice some of which walked about in a fairly normal manner at times, the bone atrophy was tentatively attributed to a reduced blood supply notable in the surrounding

dystrophic musculature. Genetic errors in the bone associated with dystrophic muscle constitute a possible explanation but were not mentioned.

Chronic interstitial pneumonitis. *Gross, P. p. 706.*



AMERICAN JOURNAL OF PHYSICAL MEDICINE. *Vol. 39, June 1960.*

◇ **Management of Painful States in Injuries of the Spinal Cord and Cauda Equina. E. G. Krueger. pp. 103-110.**

Painful states associated with injuries of the spinal cord are frequent, but in only ten per cent of the patients is the pain so intractable as to require surgical treatment. The pains described by patients are usually vague and burning, however, sharp, shooting pains and dysesthesias similar to phantom limb pain are also present.

The author accepts the view that in most instances pain originates from lesions of intraspinal content without participation of previously postulated peripheral mechanisms or "by-passing" of the lesion via sympathetic pathways. Specifically, the sharp, shooting radicular pains are probably associated with scar formation around intact or partially intact nerve roots. The more diffuse burning, vague type of pain projected into anesthetic areas is probably associated with neuroma formation and severed nerve roots or at the proximal stump of the severed spinal cord. A third type of pain is a visceral pain usually observed following enemas or distension of the urinary bladder, as manifested by a feeling of fullness in the abdomen, headaches and flushing of the face and neck.

Before surgical procedures are considered for relief of pain, studies such as somatic or sympathetic nerve blocks, caudal, procaine, and target type spinal anesthesias are recommended as prognostic guides. Surgical procedures include posterior rhizotomies and anterior lateral cordotomy. Exploration at the site of the spinal injury either early or late is of value in the relief of pain. Resection of scar tissues, removal of bony fragments, and bony overgrowth in some cases yield gratifying results.

◇ **Effective Neck Traction with Less Weight. E. H. Weissenberg. pp. 96-102.**

For effective cervical spine traction in the supine position, the tractive force must be greater than the opposing force of the neck and its contents and the opposition offered by friction between the head and its supporting surface. To reduce friction forces, the author utilizes a padded head rest mounted on roller bearings which rolls freely over a masonite board on the mattress. By this technic the tractive force may be reduced by one-half and still achieve the same results. Less bone necrosis occurs and there is less of a likelihood of Crutchfield tongs being torn from the skull during the period of time needed for skeletal traction. Another advantage is the lessened likelihood of motion and possible angulation of the fractured parts when the patient is being placed on a bedpan or is receiving other nursing care, since the head will move freely with shifts of body position.

Changes in blood flow, oxygen uptake and tissue temperature produced by therapeutic physical agents. II. Effect of shortwave diathermy. *Abramson, D. I.; Y. Bell; H. Rejal; S. Tuck; C. Burnett, and C. J. Fleischer. p. 87*

Polarized air as an adjuvant in the treatment of burns. *David, T. A.; J. R. Minehart, and I. H. Kornbluth. p. 111.*

AMERICAN JOURNAL OF PHYSIOLOGY. *Vol. 198, April 1960.*

◇ **Experimental Obesity and Osteoarthritis. L. Sokoloff; O. Mickelsen; E. Silverstein; J. E. Jay, Jr., and R. S. Yamanoto. pp. 765-770.**

In order to evaluate experimentally the prevalent view that obesity aggravates degenerative joint disease, the present study was undertaken. Mice of three different genetic strains and rats were subjected to various dietary regimens for 16 months. Four types of experiments were undertaken — (1) joint disease in diet induced obesity in mice; (2) joint disease in diet induced obesity in rats; (3) joint disease in obese prone mice as affected by body weight restriction, and (4) genetic dissociation of obesity and joint disease. From experiment (1) it was shown that marked obesity occurred in each strain of mice fed the high fat diets (39% to 76% heavier). One high fat diet produced a statistically significant increase in joint disease in the arthritis prone strain STR/1N. A similar effect was observed with the C_{57}L/HeN

strain. However, there was no consistent effect of obesity *per se* on the severity of joint disease. Though all high fat diets produced obesity, they did not all produce the same degree of osteoarthritis. Body weight restriction did not protect STR/1N mice from severity or incidence of osteoarthritis. A correlation was observed between rate of growth and ultimate presence of joint disease. The authors conclude that something associated with obesity or its development contributed to the incidence of joint disease. The evidence suggests an indirect rather than a direct causal relation. Crosses between the disease prone, spontaneously obese strain STR/1N and the A/LN strain, a lean strain resistance to joint disease, were resistant to articular degeneration.

◇ **Alterations in Tissue Blood Volume Induced by Tourniquet Application. J. J. Friedman. pp. 886-890.**

Tourniquets were applied to both hind legs of male albino mice of the CF-1 strain without general anesthesia. Animals were sacrificed at intervals of 30 minutes to 10 hours after tourniquet application by rapid immersion in liquid nitrogen. This procedure results in solid freezing of the mouse (stomach temperature 0 C.) within 25 seconds. The results showed that circulating plasma volume decreased by about 15 per cent as a result of the procedure while circulating red cell volume remained constant. Among the specific tissues, those in which the plasma volume changed significantly were liver (−25%), kidney (−10%), spleen (−25%), muscle exclusive of the limbs involved in the tourniquet (+40%). Circulating red cell volume decreased significantly in the spleen and liver and increased significantly in kidney and muscle. An apparent defect in the experiment was the lack of data for controls that were restrained but to which the tourniquet was not applied.

Influence of decreased vascular pressures on mechanics of ventilation in dogs. *Lewin, R. J.; C. E. Cross; P. A. Rieben, and P. F. Salisbury. p. 873.*

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ARCHIVES OF NEUROLOGY. *Vol. 3, July 1960.*

◇ **Cutaneous Reflex Changes in Development and Aging. J. W. Magladery; R. D. Teasdale, J. H. French, and E. S. Basch. pp. 1-9.**

Plantar and abdominal reflex responses were studied in patients ranging in age from one day to 83 years. For purposes of comparison they were divided into seven groups as follows: one to three days old; five to seven years old; 10-12 years old; 15-18 years old; young adults averaging 32 years of age; and older persons averaging 75 years of age. The reflexes were elicited by a blunt, manually applied scratching device, a moderately painful electrical stimuli and by tapping the sole of the foot as a signal for rapid voluntary plantar flexion. The initiating stimuli triggered sweeps of a synchronized cathode ray oscilloscope which also recorded the action potentials of the appropriate muscles. The delay could thus be photographed and measured.

When compared with young adults the latencies of the reflex responses produced by stroking were delayed in the younger and older age groups. The latencies produced by electrical stimuli were significantly shorter for all age groups. Both the electrical and voluntary responses were prolonged in the younger age group but were not significantly different in the younger adults and the older age groups. The authors feel that some alteration in central nervous system mechanisms rather than regressive changes or immaturity at the periphery are responsible for the longer latencies in the elderly and childhood groups. They suggest that during aging and immaturity there is a diminished excitatory influence from higher levels. The similar voluntary reaction time to stimuli in the young adults and the aged could be explained by a momentary reversal of this diminution in expectation of the stimulus. In the case of electrical stimulation the afferent volleys are more intense and short-lived than the volleys evoked by stroking. The eventual efferent volley is thus less dependent on summation with other, central, excitatory mechanisms and the reaction times of the aged groups and the young adults are again similar. In children, however, central maturation has not progressed sufficiently to provide adequate excitatory influences from higher levels and despite more intense afferent stimulae the reaction time remained prolonged.

◇ **Fusimotor Nerve Function in Man. W. M. Landau; R. A. Weaver, and T. F. Hornbein. pp. 10-23.**

Fusimotor nerve function was studied by means of differential nerve block in normal patients and in spasticity and rigidity. This was accomplished by means of intrathecal and epidural injection of local anesthetic agents. A brief review of previous material is presented. This advances the theory that the sensitivity of muscle spindle stretch receptors is modulated by the

level of activity of the fusimotor neurones. These neurones produce shortening of the intrafusal muscle fibers and consequent potentiation of discharge due to stretch of the related annulospinal and flower-spray afferent end-organs. The fusimotor fibers are gamma efferent fibers which are small and it has been shown that fibers of smaller diameter and slower conduction rate are more susceptible to nerve block than larger ones. During the differential nerve block, muscle strength, muscle tone, tendon reflex and various sensory manifestations were measured repeatedly.

The authors found that tendon reflexes in normal subjects and in subjects with spasticity and rigidity are much more vulnerable to depression than is strength. In the normals the reflex response was depressed 80 per cent or more before muscle weakness was detected, indicating that conduction of the largest diameter (alpha) efferent fibers was maintained while the conduction of the gamma efferent (fusimotor) fibers was not. Spasticity, rigidity, and Parkinsonian tremor are also decreased in large degree without loss of strength. Experiments with the H reflex indicate that tonic fusimotor activity increases the tonic muscle stretch receptor activity which in turn increases the excitability of the motoneuron. Thus tendon jerks, spasticity and rigidity are dependent upon the fusimotor system in the same sense that they are dependent upon the function of the alpha motoneurons and the muscle itself.

It was also found that pinprick, heat, and cold sensations were most vulnerable to the differential block and that they were usually affected simultaneously and to a similar degree. As the block became more pronounced vibration sense and then light touch and position sense decreased. Loss of strength always occurred in the segments which showed loss of touch and position sense. This again indicates that these later senses are carried predominantly by the largest diameter fibers.

Observations on human subjects living in a "slow rotation room" for periods of two days. *Graybiel, A.; B. Clark, and J. J. Zarriello. p. 55.*

Neurological eponyms. *Barrows, H. S. p. 91.*

ARCHIVES OF PATHOLOGY. *Vol. 70, July 1960.*

◇ **Inhibition of Progress of Preestablished Atherosclerosis by Diethylstilbestrol in the Rabbit. P. Constantinides, and N. Gutmann-Auersperg. pp. 35-42.**

Rabbits were fed high cholesterol diets for nine weeks and almost uniformly their plasma levels rose over 2,300 per cent. Four groups of 18 each were chosen for investigation. The first was killed after the nine weeks of high cholesterol feeding to serve as early controls. The remaining groups were sacrificed eight weeks later. The second group ate a normal diet during the eight weeks and served as late controls. The third group was also fed a normal diet but received two mg./kg. of diethylstilbestrol subcutaneously in addition. The fourth group was fed less than half a normal diet for the eight weeks to induce obvious weight loss.

In none of the groups did the plasma cholesterol return to normal values in the eight weeks of low cholesterol diets, although there was a gradual fall to 300 or 400 per cent from the original 2,300 per cent elevation. However the estrogen treated group did not show the progression of aortic atherosclerosis as did the two other surviving groups; rather it was nearly identical in extent with the early control group. The late control and starved groups developed more than twice the amount of aortic atheromatosis found in the early control group. In contrast to the aorta, the coronary vessels showed relentless progression of atheromatous deposits, estrogen having no effect whatever. The early control group as would be expected had less coronary atheromatous deposits than the others. An interesting and significant effect was the development of hepatic cirrhosis in all of the estrogen treated animals, while the livers were unaffected in the other three groups. Passing comment was offered to the analogous clinical observation that rarely do biliary cirrhotics develop atherosclerosis despite frequently high serum cholesterol levels. It should be emphasized that the estrogen had no effect in lessening the already developed aortic atheromatosis, but did inhibit further progression in the aorta but not in the coronary vessels. Various tentative suggestions are offered but the essential mechanism remains unexplained.

◇ **The Human Aorta. (sixth of a series, this being on the subject of regression of atherosclerosis in pulmonary tuberculosis) P. Eilersen, and M. Faber. pp. 103-107.**

The intima and media of 50 aortas from patients dying from pulmonary tuberculosis were studied in regard to dry weight and calcium and cholesterol content and the data analyzed. Normal control material was used to compare the several factors and due regard to age at time of death was constantly stressed. The dry weight of the aortas in both groups was nearly

identical. Calcium content similarly showed no difference in the two groups. Statistical evidence in this study confirms the widely held clinical impression that there is a gradual, almost inexorable process of calcium deposition in the aorta with advancing age. With regard to cholesterol content of the aorta, the figures were lower for the tuberculous group. The difference was not great but statistically significant, leading to the hypothesis that cessation of deposition rather than some process of dissolution would more readily explain the disparity. Data from this study also suggest that emaciation rather than the disease process is the essential factor in halting the usual progression of aortic atheromatosis in the phthisic cases as well as in population groups subsisting on low calorie diets.

Myocardial necrosis induced by temporary occlusion of a coronary artery in the dog. *Jennings, R. B.; H. M. Sommers; G. A. Smyth; H. A. Flack, and H. Linn. p. 68.*

Hypertensive cardiovascular disease of dog. *Muirhead, E. E.; F. Jones, and J. A. Stirman. p. 108.*

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BRAIN. *Vol. 83 (Part 2) 1960.*

◇ **Constructional Apraxia Associated with Unilateral Cerebral Lesions — Left and Right Sided Cases Compared. M. Piercy; H. Hecaen, and J. DeAjuriaguerra. pp. 225-242.**

The authors are concerned in this report with defective execution of constructional tasks under visual control. There continues to be controversy over the role of lesions of the "dominant" hemisphere versus "nondominant" in causing these difficulties. During the years 1947-1955 there were 67 patients with unilateral lesions who showed "constructional apraxia" out of a total of 261 patients having unilateral lesions, for the most part tumors. In 25 the lesion was in the left hemisphere, in 42 the lesion was in the right. Two-thirds of the patients with right-sided lesions tested failed to draw simple geometric figures such as a square, diamond, cross, circle or triangle whereas only about one-sixth with left-sided lesions tested failed, and these all had clinically evident apraxia. A similar trend was demonstrated with match stick designs. The authors believe it significant also that drawings by the left-sided cases tended to be more simple than those of the right-sided cases. They conclude that the right cerebral hemisphere in right-handed people has a special non-subordinate role in construction performance.

◇ **Visual-Constructive Disabilities Associated with Lesions of the Left Cerebral Hemisphere. J. McFie, and O. L. Zangwill. pp. 243-260.**

Eight case histories of right-handed patients with left hemisphere tumors are presented. All showed some evidence of general impairment. They note a tendency to simplification of design which is greater in patients with left-sided lesions than in right-sided cases, similar to that reported by Piercy in the same issue. Likewise, the authors note the preponderant localization of the lesion (not remarked upon in that study) in the parietal region and particularly the posterior parietal area. They demonstrate failures similar in some ways to those previously associated with right hemisphere lesions, but with what they believe are distinctly different signs, assigning the problem of constructional apraxia back to the dominant hemisphere once more. It would appear from comparing and contrasting the data presented in those two papers that both groups of authors tend to over interpret the evidence, first of all, to show any real localization and, second of all, to attempt differentiation of visual-motor performance into such finely divided areas. It is possible to interpret both sets of data as indicating an integrated and interdependent function of the central nervous system in the performance of visual motor activities.

Persistent memory defect following encephalitis. *Rose, F. C., and C. P. Symonds. p. 195.*

Apraxia of gait: A clinico-physiological study. *Meyer, J. S., and D. W. Barron. p. 261.*

Intraspinal tuberculous granulomata. *Arseni, C., and D. Samitca. p. 285.*

Studies on cerebral blood flow in man, using radioactive-labelled erythrocytes. *Nylin, G.; B. P. Silfverskiold; S. Lofstedt; O. Regnstrom, and S. Hedlund. p. 293.*

Physiological observations in stereotaxic operations in extrapyramidal motor disturbances. *Hassler, R.; T. Riechert; F. Mundinger; W. Umbach, and J. A. Ganglberger. p. 337.*

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BRITISH MEDICAL JOURNAL. *Vol. 1, April 1960.*

◇ **Problems of an Aging Population. J. H. Sheldon. pp. 1223-1226.**

The changing problems of the aging population and the role of the family in relation to old age are discussed.

The author observes that though official old age begins at 60 for women and 65 for men, it is broadly true to say that the problems of aging that are causing anxiety to our present society derive in the main from those beyond the age of 70, for until then individuals tend, by and large, to be donors rather than debtors to society. An arbitrary division of old age into two groups, those on each side of the middle seventies is made. Some of the medical, social and economical problems and needs of the two groups are reviewed. The role and responsibilities of the family and of the community are briefly discussed. All adequate provisions should be made for the treatment and care of old people, especially in the first group, in their own home. This is indeed what the majority of old people themselves desire.

Problems of an aging population. *Roth, M. p. 1226.*

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BRITISH MEDICAL JOURNAL. *Vol. 1, May 1960.*

◇ **Steroid Arthropathy of the Hip. D. R. Sweetnam; R. M. Mason, and R. O. Murray. pp. 1392-1394.**

The possible development of "steroid arthropathy" of the hip during prolonged treatment with either oral or intra-articular administration of corticosteroids is discussed by the authors.

After a brief review of the literature, they describe four cases of their own in whom painless destructive changes in the hip joint developed rather rapidly. The hip joint appears to be particularly susceptible, presumably because the enormous force transmitted through it renders it most liable to damage especially when pain is relieved. Destructive changes may develop in arthritic as well as previously normal hips and the danger of their occurrence should always be borne in mind.

◇ **Lower Limb Pain in Chronic Rupture of Abdominal Aneurysms. C. R. Savage, and E. J. Gallagher. pp. 1542-1543.**

Chronic rupture of aortic and iliac aneurysms may give rise to misleading symptoms and simulate atypical "sciatic" root pain.

Three cases are presented by the authors — two of aortic and one of common iliac artery aneurysm. All were presented with pain referred to the lower limb and treated under the impression that this was due to a skeletal cause, until sudden acute rupture of the sac revealed their true nature.

The condition should be considered in the differential diagnosis of unusual cases of pain in the back and lower limb.

◇ **Rheumatoid Neuropathy. F. D. Hart, and J. R. Golding. pp. 1594-1600.**

The occurrence of neuropathy in rheumatoid arthritis represents, according to the authors, a frequently overlooked complication.

Forty two rheumatoid arthritics (18 males and 24 females) with clinical signs and symptoms of peripheral neuropathy are reported. The neuropathy is usually symmetrical and is primarily sensory, motor findings occurring in the more severe cases. Dysesthesias and parasthesias are usually complained and on examination all modalities were found to be reduced in the affected areas: light touch, pinpoint discrimination, heat and cold and vibration sense. Position sense was usually found well preserved. In general the neuropathy was of symmetrical pattern, leg and feet being affected more than hands and arms. A stocking and glove distribution was commonly observed.

Though the neuropathy has been suggested by other observers to be due to diffuse arteriopathy with arteritis of the vasa nervorum or related to steroid therapy, these factors could not be incriminated in the cases studied by the authors.

Peripheral neuropathy in rheumatoid arthritis is considered to occur as an integral part or complication of the rheumatoid illness and the authors have therefore termed the condition "rheumatoid neuropathy."

◇ **Treatment of the Carpal-Tunnel Syndrome. R. S. Crow. pp. 1611-1615.**

The author reports his experience in the treatment of the carpal-tunnel syndrome with the three most recommended methods: 1) immobilization of the wrist; 2) injection of hydrocortisone, and 3) division of the flexor retinaculum. The series consists of 81 cases, 72 female and 9 male. Symptoms were bilateral in 51 and unilateral in 30 and their duration varied from a few weeks to 44 years.

Immobilization of the wrist at night in a "neutral" position induces a fairly rapid remission of symptoms in about 75 per cent of the patients, but the long term results are likely to be satisfactory in only about half of these. Injection of hydrocortisone into the carpal-tunnel will in almost all cases bring about a striking remission of symptoms. In most cases however, remission, though sometimes lengthy, is only temporary. Where for economic or any other reasons a sure cure is called for, with the least risk of relapse and no necessity for prolonged treatment, operation is indicated. Surgical treatment offers almost certain and permanent relief.

◇ **Median Nerve Palsy as a Complication of Acute Pyogenic Infections of the Hand. G. D. Oates. pp. 1618-1620.**

This is a report on three cases of acute carpal tunnel syndrome resulting from severe pyogenic infection of the hand. Two other cases reported in the literature are mentioned. Interference with median nerve function resulted most likely from compression by inflammatory swelling in the carpal tunnel.

The occurrence of this complication should be kept in mind in all severe acute hand infections and treated by division of the transverse carpal ligament.

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BRITISH MEDICAL JOURNAL. *Vol. 1, June 1960.*

◇ **Bell's Palsy: Some Problems of Prognosis and Treatment. G. A. Dalton. pp. 1765-1770.**

This study is based on a survey of 107 cases with Bell's Palsy examined by the author during the two-year period 1954 to 1956. The aims of the investigation were to seek criteria which may give guidance on the probability of spontaneous recovery and to assess the value of present methods of treatment.

The probability of complete recovery of facial function would appear to be lessened by the presence of pain at the onset, and is much diminished by the presence of auditory-nerve symptoms and herpes. The extent to which the branches of the facial nerve itself (chorda tympany, nerve to the stapedius, greater superficial petrosal nerve) are clinically involved has no prognostic significance except possibly in the case of lacrimal hyposecretion. The electrodiagnostic and electromyographic methods were briefly mentioned and these tests were carried out only in a few cases to allow for an assessment of their prognostic value.

Treatment in the present series was mainly by standard methods and it is well agreed that 75 per cent to 85 per cent of patients make a full recovery under such a regime. Current views on decompression are discussed and four patients so treated are presented. No clear evidence emerges from this series to prove the value of facial nerve decompression.

◇ **Peripheral Neuropathy in the "Collagen Diseases." R. F. Kibler, and F. C. Rose. pp. 1781-1784.**

Peripheral neuropathy is not a rare complication in some of the "collagen diseases." Particularly high and well recognized is its incidence in polyarteritis nodosa. Disseminated lupus erythematosus and rheumatoid arthritis are also accompanied occasionally by signs and symptoms of polyneuropathy.

In view of the extreme rarity of peripheral neuropathy in scleroderma and in dermatomyositis as compared with the other members of the collagen diseases, the case of a 55 year-old woman with scleroderma complicated by sensorimotor peripheral neuropathy is reported. The literature relating to the association of peripheral neuropathy and the collagen diseases is reviewed and the pathogenesis of the neurological lesions discussed.

◇ **Expiratory Pressure and Air Flow During Speech. M. H. Draper; P. Ladefoged, and D. Whitteridge. pp. 1837-1843.**

Production of sustained speech depends upon the ability to produce a sustained positive pressure in the trachea by means of the activity of thoracic and abdominal muscles.

The authors have recorded and measured the tracheal pressure and the electrical activity of the diaphragm and other respiratory muscles during the speech of normal persons and of patients with complete spinal transection. The louder the speech the higher the pressure in the trachea. If the loudness is kept constant, then the mean pressure in the trachea will also remain remarkably constant, despite the fact that the thoracic volume can change from maximum inspiration to maximum expiration.

To attain a steady level of tracheal pressure throughout an expiration, the inspiratory muscles—the external intercostals — at first oppose the relaxation pressure; then expiratory muscles, beginning with the internal intercostals and later involving other muscles, such as the rectus abdominis, reinforce the diminishing relaxation pressure.

There is usually a short period, at the beginning of expiration, when all muscles are inactive and the relaxation pressure acts alone.

A number of paraplegics with lesions in the cord at levels ranging from C4 to T12 were examined. The maximal expiratory pressure that can be exerted is lower the higher the level of transection. A striking observation was that patients with lesion at C8 to T1 used the latissimus dorsi largely for talking.

◇ **Short-leg Syndrome. P. J. R. Nichols. pp. 1863-1865.**

The incidence of different leg lengths in otherwise normal subjects and how much this difference may be associated with symptoms is reviewed by the author.

The clinical diagnosis of short leg is defined as depending on the presence of a difference in leg length of ½ inch or more. The clinical diagnosis of short-leg syndrome assumes the presence of short leg with associated symptoms, mainly low back ache or pains in the leg.

Asymptomatic, idiopathic short leg occurs in approximately seven per cent of the population without giving rise to symptoms. Short leg was encountered in 22 per cent of patients complaining of low back pain. Short leg after fractures of lower limb or associated with short artificial leg is a problem frequently encountered in rehabilitation and may also give rise to low backache, faulty postures and abnormal pressures on other joints. The diagnosis and treatment of differences in leg lengths may prevent much inconvenience and suffering. The treatment is by an approporiate shoe-raise.

◇ **Persistence of Antibody in Adolescents and Adults after a Third Booster Dose of Poliomyelitis Vaccine. E. J. C. Kendall; T. S. L. Beswick; A. Miller, and J. H. Tobin. pp. 1689-1691.**

The poliomyelitis antibody level in 54 adolescent and adult subjects was measured 18 to 24 months after a third dose of inactivated poliomyelitis vaccine. The author showed that neutralizing antibodies to types 2 and 3 poliovirus persisted at a much higher level than antibody to type 1. Though individuals lost antibody at different rate it was noted that, in general, the higher the response two weeks after a third dose, the higher the titer after periods of up to two years. The average fall in titer for all types after the third dose was from 76 to 81 per cent in 18 to 24 months.

If the average antibody fall is presumed to continue, titers would reach, after an interval of about five years, a level of one per cent of the post-third-dose titers. The relation of these findings to the efficacy of vaccination is discussed.

◇ **Persistence of Antibody in Children after a Third Dose of Poliomyelitis Vaccine and Their Response to a Fourth. J. S. Logan; A. M. Field; A. D. Macrae; A. Miller, and J. O. H. Tobin. pp. 1692-1694.**

Determination of poliomyelitis antibody level was carried out in 27 children to find out whether they still had antibody two years after the third booster dose of poliomyelitis vaccine.

All children except one still had detectable serum antibody to all three polioviruses. The antibody fall during the two years was estimated to be 78-79 per cent for all three virus types.

A good response to a fourth dose of the inactivated vaccine, and similar to that after the third, was found in most of the children.

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BRITISH MEDICAL JOURNAL. *Vol. 2, July 1960.*

◇ **Use of Phenol in Relief of Spasticity. L. A. Liversedge, and R. M. Maher. pp. 31-33.**

The authors describe the use, the technic and the results of intrathecal injection of phenol in glycerin for relief of spasticity and especially of painful spasm of lower extremities.

A five per cent strength solution of phenol in glycerin was found to be both safe and effective. Quantities from 0.5 to 1.5 ml. have been given at each session. With proper technic and careful positioning of the patient, the blocking effect of the drug can be quite localized at one or more roots. The maximum safe efficiency has been obtained from injections either at L 2-3 or L 3-4 intervertebral spaces though occasionally the L 4-5 spaces has been used. Involvement of the sphincters is likely to occur if phenolization reaches the cord itself (at L 1) or descends to the sacral roots, and this has been the major complication encountered by the authors.

Thirty two patients with severe spasticity due to various causes (multiple sclerosis, hemiplegia, paraplegia, etc.) have been treated. Some of the patients received up to six separate injections, so that seventy-five was the actual number of intrathecal injections given. Reduction in muscle tone and pain is usually evident within 60 seconds after the injection. The duration of the reduction in spasticity may vary greatly from patient to patient; in the main however, it seems that appreciable benefits can be expected from an average of at least six to twelve months. Care should be exercised in administering the treatment to patients who are still ambulant.

◇ **Muscle Pains that Follow the Administration of Suxamethonium. C. A. Foster. pp. 24-25.**

Muscle pains that follow the administration of suxamethonium are a common complication of modern anesthesia. Their incidence is related to age and whether the patient is kept in the hospital or sent home after the operation. Pain is significantly less in patients over 60 years of age. The incidence can be reduced and of the methods used in this investigation, only the prior injection of gallamine triethiodide shows a statistically significant improvement.

The use of a non-depolarizing relaxant prior to the administration of a depolarizing agent, however, is not without danger; larger doses of the depolarizing agent are required to produce similar conditions to those obtained when a non-depolarizing agent is not used, and difficulty may be experienced in the establishment of normal respiration particularly in patient for bronchioscopy. This practice therefore is not recommended.

Jacksonian ideas and future, with special reference to aphasia. *Critchley, M. p. 6.*

Brain, movement and time. *Dott, N. M. p. 12.*

THE JOURNAL OF BONE AND JOINT SURGERY. *Vol. 42A, June 1960.*

◇ **Stabilization of the Cervical Spine by Anterior Fusion. R. W. Bailey, and C. E. Badgley. pp. 565-594.**

Anterior fusion of two vertebral bodies of the cervical spine is an excellent means of establishing stability and is an alternative when the posterior approach would be difficult, hazardous or unsuited to the pathological condition at hand.

The indications for anterior fusions are broad: (1) With destructive lesions of the vertebral body, the anterior approach allows easy access for biopsy and resection of the lesion and restoration of stability. (2) In certain situations after fracture dislocation. It has been the authors' observation that after fracture dislocation of the cervical spine, the integrity of the vertebral disc is altered and recurrence of dislocation at a later date is a distinct possibility. If recurrence of this dislocation is eminent or has occurred anterior fusion is a useful method of restoring stability. (3) After extensive laminectomies for decompression, spinal cord stability can be restored most effectively by anterior fusion. (4) For cervical spine stabilization after maxillo-facial injuries, the anterior fusion facilitates maintenance of an adequate airway since the patient is supine during this procedure. (5) Anterior fusion is indicated after a fracture dislocation in a neck with severe spondylosis. If at a later date symptoms from the spondylosis develop the way will be open for laminectomy, decompression, or foraminotomy.

The author has not extended the anterior approach to problems of herniation of the cervical vertebral disc. Decompression of the cord or nerve roots may be required which is more readily achieved through the posterior approach.

The author has stabilized the cervical spine with anterior fusion in 20 patients. No complications specifically relating to the technic occurred and fusion was achieved in all but two patients. The latter two patients were fused less than six months prior to the time of writing.

◇ **Vascular Patterns in Immobilized-denervated, or Devascularized Rabbit Limbs. A. B. Ferguson, Jr., and Y. Akahoshi. pp. 617-624.**

This paper is an attempt to cast light on some of the physical forces that influence the metabolism of muscle after immobilization, denervation, or devascularization. Using the injection technic, the vascular pattern of the muscles of female rabbits were studied roentgenographically. The limbs were studied following immobilization in plaster with or without internal fixation; following internal fixation of the joint alone; following neurectomy; following tenotomy and following ligation of the femoral artery.

The changes in vascular pattern noted after cast immobilization were dilitation of the main arteries, and increased vascularization about knee and ankle joints. After internal fixation alone similar changes occurred except that there was no dilitation of the main arteries. Increased arborization of small muscle vessels was noted after femoral artery ligation. Diminished vessel size, and bizarre vascular patterns were noted after both denervation and tenotomy.

Delayed neurological sequeli of a retained foreign body (lead bullet) in the intervertebral disc base. *Shroyer, R. N.; C. H. Fortson, and C. B. Theodotou. p. 595.*

Flexor-tendon ruptures in the forearm and hand. *Boyes, J. H.; J. N. Wilson, and J. W. Smith. p. 637.*

Acute hematogenous osteomyelitis. A review of 66 cases. *Winters, J. L., and I. Cahen. p. 691.*

EXPERIMENTAL NEUROLOGY. *Vol. 2, June 1960.*

◇ **Diaphragmatic Function Following Anastomosis of Recurrent Laryngeal and Phrenic Nerves. L. Guth; L. Soutter; K. Frank; J. Campbell, and J. B. Lloyd. pp. 251-260.**

The present study was undertaken to determine whether diaphragmatic function can be restored after reinnervation by the recurrent laryngeal nerve.

Unilateral anastomosis of the recurrent laryngeal and phrenic nerve was performed in eight rats and three monkeys. Six out of eight rats exhibited rhythmic contraction and recordable muscle potentials of the ipsilateral hemidiaphragm six to nine months after the anastomosis. Fourteen months postoperatively, only one monkey was observed to have spontaneous diaphragmatic function. However, in all three monkeys, rhythmic respiratory activity was evoked by asphyxia. Irritation of the trachea also produced a burst of activity in the diaphragm.

No reliable quantitative statement can be made from this limited experience, but the authors conclude that the recurrent laryngeal nerve can restore function to the paralyzed diaphragm in the rat and monkey. It is anticipated that a similar procedure in man might result in restoration of some diaphragmatic function after paralysis following such diseases as bulbar poliomyelitis. Further animal experimentations are necessary.

JOURNAL OF CHRONIC DISEASES. *Vol. 2, April 1960.*

◇ **The Treatment of Obesity: An Analysis of Methods, Results, and Factors Which Influence Success. A. R. Feinstein. pp. 349-393.**

This paper is a review of the available results of treatment in obesity. The literature has been searched and the data have been tabulated and analyzed according to various criteria. These include environmental control and restriction using natural foods, total replacement of foods by nutrient mixtures, and the use of various dietary adjuncts intended to depress appetite, change mood and/or body homeostasis. The measures of success listed were rates of weight loss as a percentage of the initial weight before therapy was begun, and weight loss of 20 pounds and/or 40 pounds.

Analysis of results was made difficult because of differences in the criteria of measurement and because of inconsistencies in methods of reporting results. When reasonable comparisons could be made, however, the data showed that complete restriction of environment such as hospitalization produced a consistent weight loss which was proportional to the amount of caloric restriction. In the outpatient environment, which was necessarily uncontrolled, no reported diet was predictably successful. It was also interesting that identical dietary regimens produced markedly different results when used by different physicians. Sometimes drastic caloric restriction or diets markedly different from traditional nutritional regimens were associated with remarkably high rates of accomplishment. Whenever complete results were

given for any particular dietary program the data showed that more patients failed than succeeded. It was the author's conclusion that these results permit the hypothesis that weight reduction involves the patient himself, the therapeutic relationship, and the dietary program. Certainly the dietary program itself was often the least important factor. The non-dietary factors have been ignored or unmeasured. The implication of this review is that more success in the treatment of obesity may be obtained when there is less rigid devotion to traditional concepts of diet, drug supplements and psychotherapeutic devices. Certainly more attention should be given to the patient himself and to his relationship to the physician prescribing therapy.

◇ **Factors Influencing the Prognosis of Cerebral Thrombosis and Infarction Due to Atherosclerosis. N. J. David, and A. Heyman. pp. 394-404.**

This paper is a study of the survival of 100 patients with cerebral infarction or ischemia due to atherosclerosis who were admitted to Duke University Hospital or the Veterans Administration Hospital in Durham during an eight-month period from January, 1957, to September, 1957. The mean age was 57.3 years. Fifty of the 100 patients had either persistent elevation of blood pressure during their hospitalization or gave a reliable history of long standing blood pressure elevation. Fifteen of these 50 were considered to have severe hypertensive disease on the basis of grade 3 or 4 retinopathy. Thirty-seven of 85 patients tested had electrocardiographic abnormalities indicating myocardial infarction, myocardial ischemia, ventricular hypertrophy or disturbances of rhythm such as atrial fibrillation or flutter. Diabetes was present in eight patients. Twelve others had convulsive seizures at the onset of their stroke or subsequently.

In 48 patients the site of the infarction or ischemia was considered to be in the territory of the carotid artery, in 32 patients the vertebral-basilar system was involved, and in the remaining 20 cases the location could not be determined with certainty. Nine of the 48 patients with lesions in the cerebral hemispheres were diagnosed as having thrombosis of the carotid artery on the basis of arteriograms or retinal artery pressure determinations. Twenty-three patients had a history of previous cerebral infarction. Thirteen of these had signs of pseudobulbar palsy or bilateral cerebral damage.

Hospital therapy consisted of early ambulation, physical therapy and supportive care. Twenty-six patients had anticoagulant treatment during the period of hospitalization which averaged three weeks. Of these, 13 were maintained on anticoagulants after discharge. Functional capacity of the 100 patients was determined at the time of their discharge and at the end of the first and second years thereafter at which times all patients were sent a questionnaire requesting the patients' working ability, and patients' health since leaving the hospital.

During hospitalization ten of the 100 patients died. Nine died because of cerebral infarction or its complications. In one, death followed cerebral arteriography. Of the 90 patients who were discharged from the hospital ten were able to return to their former employment within a few weeks, 35 were ambulatory and able to carry out light part-time work and 28 could care for their personal needs, feed themselves and get about with the aid of a wheelchair or cane. The remaining 17 patients were bedridden and required nursing care.

Twenty-three additional patients died during the two years following admission to this study. Postmortem examinations were performed on one-third of the 33 patients and revealed cerebral infarction due to atherosclerosis. Of the 22 deaths not followed by autopsy, 11 occurred in the hospital under observation of the authors and in the remaining 11 adequate clinical information as to the cause of death was available from the patient's family or physician. Of the 33 deaths in the first two years, 29 were thought to be due to vascular disease in various organs or its complications.

Of the 67 survivors, 36 reported general clinical improvement at the end of the second year, 22 believed there had been no change and 9 patients stated they had become worse. In terms of functional capacities, 16 patients of the 67 were working at the end of the second year and 31 were ambulatory and able to do small chores or part-time work. Fifteen were capable of only minimal personal care and five were totally invalid.

In the two years following discharge, 18 or 20 per cent of the 90 patients developed recurrent cerebral infarction, eight suffered their stroke in the first year and ten during the second year. Nine of these died, five became invalids and four recovered sufficiently to return to their previous functional capacity. Factors which made for poor prognosis included a history of previous cerebral infarction, signs of diffuse brain damage or bilateral brain stem lesions, severe hypertension and electrocardiographic abnormalities.

Prevalence and incidence of coronary heart disease in strata of the labor force of a Chicago industrial corporation. *Stamler, J.; H. A. Lindberg; D. M. Berkson; A. Shaffer, and A. Poindexter. p. 405.*

Mortality from coronary heart disease and physical activity of work in California. *Breslow, L., and P. Buell. p. 421.*

Multidisciplinary studies of illness in aged persons. III. Prognostic indices in fracture of the hip. *Staff of the Benjamin Rose Hospital, Cleveland, Ohio. p. 445.*

JOURNAL OF CLINICAL INVESTIGATION. *Vol. 39, June 1960.*

◇ **Responses of the Veins and Arterioles of the Forearm to Walking During Acclimatization to Heat in Man. J. E. Wood, and D. E. Bass. pp. 825-833.**

The purpose of this study was to investigate the responses to exercise of the veins and arterioles of the forearm with respect to their roles in the process of acclimatization of man to heat.

Seven normal young men were acclimatized to heat on eight occasions by walking on a treadmill for 30 minutes four times a day at an environmental temperature of 120 F. dry bulb and 80 F. wet bulb. The vascular responses were measured by plethysmographic technics.

The forearm veins constricted with walking in the hot environment, the degree of venoconstriction being greatest on the third and fourth days of exposure to the hot environment. The arterioles dilated, the dilation being less on the third and fourth days during walking in the hot environment than on the first and second or on the final days in this environment.

The systolic and diastolic blood pressure of all of the subjects tended to be higher during walking in the hot environment. The responses of the forearm veins and arterioles were among the early evidence of acclimatization to heat and they coincided with the disappearance of the symptoms of heat exhaustion with exercise. These results support the concept that important adaptations in acclimatization of man to exercise in a hot environment take place in the cardiovascular system. On the other hand, the disappearance of these vasomotor adaptations on later heat days in the face of continued acclimatization encourages a search for other mechanisms that maintain the circulation during later days in the heat.

◇ **Strontium and Calcium Metabolism in Metabolic Bone Diseases. E. C. Dow, and J. B. Stanbury. pp. 885-903.**

In human skeletal disease, attention is usually focused on the altered metabolism of calcium. Several studies indicate that strontium may have a metabolic pathway similar to that of calcium and that radiostrontium, because of its ease of measurement, might be a convenient indicator for observing the transfer of calcium through the calcium-containing compartments of the body.

The distribution and execution of Sr^{85} and Ca^{45} administered simultaneously and intravenously were studied in patients with thyroid and parathyroid disorders, osteoporosis and Paget's disease. The results indicate that strontium qualitatively parallels calcium as an index of skeletal function in metabolic bone diseases.

A profile of electrolytes in the cartilaginous plate of growing ribs. *Howell, D. S.; E. Delchamps; W. Riener, and I. Kiem. p. 919.*

JOURNAL OF GERONTOLOGY. *Vol. 15, April 1960.*

◇ **Age Differences in Residual Lung Volume and Vital Capacity of Normal Individuals. J. Brożek. pp. 155-160.**

A general tendency for vital capacity to decrease with age is well established. In contrast to vital capacity, which is readily determined, limited information is available concerning the influence of increasing age on the volume of residual air.

In this paper residual lung volume determination for young and middle-aged men were made both under ordinary room conditions and under water and for women were made only under water. In 28 young men (mean age 23 years) and 31 older men (mean age 52 years) residual volume and vital capacity measurements were determined under ordinary room conditions. The subjects were clinically free of gross bronchopulmonary symptoms. Both groups of individuals were somewhat heavier on the average than men of the same height. The values of residual volume varied from 0.97 to 2.45 L. in the younger group and from 1.52 to 3.31 L. in the older group. On the average the residual volume of the older men was 0.6 L. larger

than in the younger subjects. The value of the mean vital capacity was found to be one L. smaller in the older group than in the younger men. As a result, the mean value of the residual volume expressed as the percentage of the total lung capacity (TLC = residual volume + vital capacity) was found to be markedly greater in the older men (35.6%, range 26.1 to 57.9) than in the younger men (24.4%, range 17.9 to 35.6).

Residual lung volume was also determined at the time of maximal expiration during complete submersion under water in normal younger and older men (33 younger men, 156 older men). The older men had the same average absolute weight but were somewhat shorter than the younger men. The mean residual volume was again found to be larger in the older age group (1.97 L. as compared with 1.53 L. for younger men). The studies of residual volume in relation to weight in a group of 156 middle aged men showed no consistent trend.

The author also studied residual volume (measured during underwater weighing) and vital capacity (measured in a seated position under ordinary room conditions) in 51 normal adult women, varying in age from 18 to 63 years. It was again found that residual volume increased with age.

In all comparisons between groups of different ages there was a tendency for the residual volume to increase with age and for vital capacity to decrease with age. The author found average values of vital capacity of 5.0 L. for the group of men averaging 23 years and 3.9 L. for the group averaging 52 years. In the women studied the author found that vital capacity decreased with increasing age from 3.5 to 2.6 L.

◇ **Rorschach Rigidity and Sensory Decrement in a Senescent Population. C. Eisdorfer. pp. 188-190.**

Some investigators claim that individuals with sensory impairment show regression, withdrawal, and rigidity in interpersonal relationship. This study was proposed in an attempt to evaluate the relationship between visual and auditory loss and personal adjustment, as reflected in rigidity of Rorschach performance, in a group of socially adjusted elderly individuals.

The author selected 48 volunteers, all of whom were 60 or more years of age. They were given physical, psychiatric and psychological examinations, including the Rorschach and the Wechsler Adult Intelligence Scale. All subjects were screened to eliminate those with neurologically definable central nervous system damage and those with extreme Verbal I.Q. scores. Piotrowski's alpha formula derived from the Rorschach was used as an indication of overcontrolled, underactive, withdrawn and rigid personality patterns.

Forty-eight volunteers were divided into six groups on the basis of three visual and two auditory levels of functioning. The results indicate 1) there is no significant difference in the incidence of high alpha scores between subjects with normal and subjects with corrected vision or between subjects with normally functioning vision and subjects with impaired vision; 2) there are significant differences in the alpha scores between subjects with normal and subjects with impaired hearing; 3) the Rorschach performance of subjects with both vision and hearing impairments is not significantly different from that in subjects showing hearing decrement alone.

This study would appear to suggest that the aged individual reacts to hearing loss by withdrawal and by increasing rigidity of personality.

Effects of retirement on personal adjustment. *Thompson, W. E.; G. F. Streib, and J. Kosa. p. 165.*

The long-term constancy of behavior. *Dennis, W. p. 195.*

JOURNAL OF NEUROPHYSIOLOGY. *Vol. 23, Mar. 1960.*

◇ **Influence of Orbital Cortex on Blood Pressure Responses in Cat. P. P. Newman, and J. H. Wolstencroft. p. 211.**

The exposed orbital surface of the frontal lobe of the anesthetized cat was electrically stimulated by means of bipolar silver wire electrodes applied to the cortical surface. An electronic square-wave stimulator allowed independent variation of frequency, pulse duration, and voltage output. Stimulation lasted for periods of one to four minutes and blood pressure was recorded with a mercury manometer from the femoral artery. It was found that strong repetitive stimulation generally resulted in a blood pressure rise of 20 to 30 mm. of mercury while a weaker stimulus produced no significant changes in the record. A stimulus strength of 12 volts was necessary. However, when the stimulus was applied during heating of the carotid blood the usual fall in blood pressure was prevented by a stimulus of 6 to 8 volts applied to

the posterior orbital gyrus. Stimulation of other parts of the orbital surface did not give this response. The authors conclude that there is a direct connection between heat sensitive structures in the medullary reticular formation and the orbital cortex. When the cells in the reticular formation of the medulla are excited, impulses pass down the reticulo-spinal pathway causing vasodilatation either by excitation of vasodilator nerves or by inhibition in the central nervous system of sympathetic vasoconstrictor nerves. When discharging this medullary mechanism can be inhibited by impulses arising from the orbital cortex.

◇ **Cord Cells Responding to Touch, Damage, and Temperature of Skin. P. D. Wall. p. 197.**

This paper examines the convergence of peripheral fibers onto primary neurons in the cord. The response to natural stimulation of the skin was examined by means of intracellular microelectrodes.

Single afferent fibers which respond to light touch on the skin of the leg appear to innervate a contiguous area of skin with an oval shape averaging 5 by 4 mm. Pressure sensitive A fibers form a continuous group in which the threshold varies with fiber diameter.

There is no justification for making an arbitrary subdivision of this group into light touch, deep touch and pain fibers. As the fiber diameter decreases within the single group, the threshold for the pressure stimulus increases and the rate of adaptation to maintain a stimulus decreases. The pattern of discharge in a single afferent fiber is fixed by the intensity and duration of the stimulus and by the position of the stimulus within the sensitive area. Some of the smaller afferent fibers respond both to pressure and temperature changes of the skin.

Those cells in the spinal cord which respond to light touch are arranged in a definite lamina. Within this lamina there is topographic organization with the peripheral part of the leg medial and the proximal part lateral. This region has also been shown to be the termination of the fast conducting fibers of skin nerves. Each central cell responds to light touch in a contiguous oval area of skin with an average size of 63 by 32 mm. The afferent fiber projection shows no signs of a subliminal fringe. The peripheral area subserved by a single cell is not affected by post-tetanic potentiation, strychnine, asphyxia and small doses of barbiturates or temperature changes. The afferent fibers converging onto a single cell run together in a small bundle in the dorsal root. Each dorsal rootlet contains many such microbundles from different parts of the leg. Those cells which respond briefly to light touch also respond with prolonged discharge to heavy pressure. All cells which respond to light touch also respond to temperature changes of the skin. The authors suggest that fibers of many different diameters converge onto these cells so that they respond to all modalities of skin sensation. However, differences in the pattern of discharge depend on the modality of the particular stimulus.

Distribution of recurrent facilitation and inhibition in cat spinal cord. *Wilson, V. J.; W. H. Talbot, and F. P. J. Diecke. p. 144.*

Precentral facilitation and inhibition of spinal mono-neurons. *Preston, J. B., and D. G. Whitlock. p. 154.*

Neuromuscular facilitation and antidromic discharged in motor nerves: their relation to activity in motor nerve terminals. *Werner, G. p. 171.*

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JOURNAL OF NEUROSURGERY. *Vol. 17, May 1960.*

◇ **Thoracic Intervertebral Disc Protrusion. C. Arseni, and F. Nash. pp. 418-430.**

A clinical study of the thoracic disc is presented based on 12 cases occurring in over 2500 protruded intervertebral discs seen at the Neurosurgical Clinic in Bucharest since 1946.

Comments are made on the 95 cases in the literature and the 12 personal cases are analyzed. The site of the protrusion was in the midline in nine cases and lateral in two. Pathogenesis of symptoms is thought to be due to direct cord compression or compression of the anterior spinal artery. The latter may account for the development of acute paraplegia in certain cases. The common symptoms were pain in the thoracic spine and motor symptoms, mainly paraparesis; but the most common symptom was hypesthesia in the segments involved. Two thirds of the cases had sphincteric disorders. Lateral protrusion produces clear-cut radicular compression with virtually no signs of cord compression. Midline protrusion in the upper segments was associated largely with pain and sensory disturbances. In the two lowest segments protrusion may produce a cauda equina picture. Calcification of the nucleus pulposis is frequent in thoracic discs when herniation occurs along with a narrowed intervertebral space.

◇ **Chemopallidectomy as a Treatment for Parkinson's Disease. P. Taarnhj; D. C. Arnois, and L. A. Donahue. pp. 459-468.**

An analysis of the results of the surgical treatment of 118 cases of Parkinsonism at the Cleveland Clinic is presented and compared with the results of others, especially those of I. S. Cooper. Chemopallidectomy was used in all cases but 12, where chemothalamectomy was performed. The balloon type cannula described by Cooper was used in only a few cases in this series.

The rate of complications in this series is definitely higher than in Cooper's series, and the duration of benefit was shorter. The criteria used to evaluate results in this series is discussed under various headings. Selection of cases as to age, general physical condition, unilaterality of symptoms and severity of the Parkinsonian picture is discussed. The possibility of wrong placement of the needle was considered but it was believed unlikely that this factor could account for the admittedly poor results. In view of Dr. Cooper's emphasis on the use of the balloon cannula in order to make several (if necessary) reversible lesions before producing the permanent lesion, it seems surprising that the authors did not mention this in the evaluation of their results except to state that they rarely used it.

The problem of neuronal regeneration in the central nervous system. I. The insertion of centrally connected peripheral nerve stumps into the spinal cord. *Jakoby, R. K.; C. C. Turbes, and L. W. Freeman. p. 385.*

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THE JOURNAL OF PEDIATRICS. *Vol. 57, July 1960.*

◇ **A Report of 16 Tumors of the Spinal Cord in Children; The Importance of Spinal Rigidity As An Early Sign of Disease. F. L. Richardson. pp. 42-54.**

The author reviews certain findings in 16 children subsequently shown to have spinal cord tumors. None of the 16 had external evidence, such as lipomata, moles or nevi, or evidence of congenital defects. In at least half of the cases, roentgenograms of the spine were reported as negative. Spinal fluid protein levels ranged from 10 milligrams per cent to 5,000 milligrams per cent. Myelograms, performed in 13 cases, indicated the level in every instance where the level of the lesion was not apparent from x-ray evidence alone. Survival after operation ranged from three months to complete recovery with no evidence of disease or disability after seven years (including a figure skating champion). Of particular interest is the complaint of pain or stiffness of the back, and the finding of painful spinal rigidity present in all these cases. The author believes that tumor involving the spinal cord almost invariably is accompanied by persistent spinal rigidity and irritability. In spite of the fact that these signs and symptoms have not been prominent in other reported series or in the reviewer's experience, the long delay in recognition, the almost invariable misdiagnosis of acute anterior poliomyelitis, hysteria, dystrophy, or cerebral palsy make it imperative that the physician who deals with rehabilitation of children suspect and look for spinal cord tumors early in order to allow maximum recovery. Prolonged pain or stiffness in the back should be regarded as evidence of impingement on the spinal cord.

Immunizing properties of live attenuated measles virus. *Doglin, J.; S. Levine; F. S. Markham; V. Cabasso; M. Weichsel; J. M. Ruegsegger, and H. R. Cox. p. 36.*

Electrophoretic analysis of serum proteins, lipoproteins, and glucoproteins in healthy newborn infants, older infants, and children in Greece. *Angelopoulos, B., and G. Bechrakis. p. 66.*

Progeria, a pathologic study. *Gabr, M.; N. Hashem; M. Hashem; A. Fahmi; and M. Safouh. p. 70*

The characteristic dentition of incontinentia pigmenti. *Gorlin, R. J., and J. Anderson. p. 78.*

Henock-Schonlein syndrome — anaphylactoid purpura. *Blattner, R. J. p. 137.*

Measles vaccine. *Editor's Column. p. 147.*

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PEDIATRICS. *Vol. 26, July 1960.*

◇ **Clinical and Epidemiologic Observations on Enterovirus Infection in a Circumscribed Community During an Epidemic of Echo 9 Infection. Lepow, M. L.; D. H. Carver, and F. C. Robbins. pp. 12-26.**

The authors present a carefully executed study of this recently recognized illness which is of interest to the physiatrist for two reasons. It is an acute febrile disease which periodically affects large numbers of people, and it is frequently the cause of aseptic meningitis, indistinguishable clinically from nonparalytic poliomyelitis. Thirty seven of 43 children under 10 years of age living in a housing development studied became ill, whereas 19 of the 36 older children and adults became ill. Echo 9 Virus recovery rates ranged from 86 per cent of the ill children to 44 per cent of ill adults with a similar trend for recovery of Coxsackie B viruses for those having that illness. The present study indicates that the incubation period is about three to seven days. Major manifestations were papular rash, fading in two to 10 days, fever of sudden onset ranging from 100 to 104 F., a contrast throbbing frontal headache lasting about three days, and stiff neck especially in adults. Viremia was demonstrated prior to the appearance of symptoms, but rarely after. Virus was present in the feces for as long as 28 days after onset of the illness. Symptoms of the individuals with Coxsackie B virus illness were quite similar except that no one was observed who had a rash.

◇ **Myasthenia Gravis in the Newborn. Greer, M., and M. Schotland. pp. 101-108.**

This is a case report of an infant showing severe weakness at birth and a review of previously reported cases of neo natal (transient) and congenital myasthenia gravis. It is stated that infants born to mothers having myasthenia gravis may show "neo-natal" myasthenia gravis requiring immediate treatment, will respond to cholinergic medication, and will become asymptomatic in three to five weeks, needing no further treatment. By contrast, infants showing symptoms who are born to mothers without the disease (congenital myasthenia) are reported to have feeble fetal movements, weak cry, ptosis, and weakness but not to show the severe initial symptoms. The symptoms persist into childhood in those individuals who survive. The case reported here is atypical according to this scheme. The mother did not have myasthenia, and did not show weakness following a test dose of intravenous d-tubocurarine. The child repeatedly responded to administration of cholinergic drugs during periods of weakness during the first few days of life. At six days of age the child required no further treatment and appeared normal at twelve weeks. The case presented thus would appear to differ from the twenty previously reported cases of "neonatal" and also from the ten previously reported cases of "congenital" myasthenia gravis. It is most likely that the so-called congenital form is rarely recognized, and that when recognized it is not usually reported. The course of events described here may well be the most common, albeit unreported, early history. The lack of systematic reporting of all recognized cases of such infrequent diseases often results in describing the atypical course as the "textbook case." Infants with cyanosis, difficulty swallowing, and generalized weakness with or without ptosis should be suspected of having myasthenia gravis and investigated, since early treatment is often adequate to prevent death, and complete recovery may ensue.

An evaluation of the treatment of phenylketonuria with diets low in phenylalanine. *Know, W. E. p. 1.*

Vitamin B_6-dependency and infantile convulsions. *Scriver, C. R. p. 62.*

Prognosis of infants born of tuberculous mothers. *Kendig, E. L. Jr. p. 97.*

Coarctation of the aorta in infants. A review of twelve years' experience. *Glass, I. H.; W. T. Mustard, and J. D. Keith. p. 109.*

The pediatrician and the individual delinquent. *Richmond, J. B. p. 126.*

Proceedings — the use of hypothermia in children. *Shields, J. R. S. p. 146.*

Clinical conference — genital abnormalities in infants associated with administration of progesteroids to their mothers. *Leibow, S. G., and L. I. Gardner. p. 151.*

NOTICES OF JUDGMENT UNDER THE FEDERAL FOOD, DRUG AND COSMETIC ACT

Rutone capsules and Rutone tablets shipped from Philadelphia, Pa.
(F.D.C. No. 42205. S. No. 35-378 P.)

Results of Investigation: Analysis showed that the capsules contained less than the declared amount of para-aminobenzoic acid.

Charge: The strength of the article, when shipped, differed from that which it purported and was represented to possess, namely, 180 milligrams of para-aminobenzoic acid per capsule. The labeling of the articles, when shipped, contained false and misleading representations that the article was an adequate and effective treatment for arthritis, rheumatism, rheumatic fever, osteoarthritis, fibrositis, and gout, and for the pain of such conditions, and that salicylamide, an ingredient of the capsules, was approximately seven times as effective in relieving pain as aspirin; and the label of the article failed to bear a warning to keep it out of the reach of children, and a warning that if pain persisted for more than ten days, or redness was present, a physician should be called immediately.

Disposition: Default, destruction.

Slenderoll Spot Reducing Device shipped by Profile Slenderizing Salons from Northvale, N. J.
(F.D.C. No. 41829. S. No. 26-432 P.)

Results of Investigation: The device appeared to be a simple roller massage device containing an electric vibrator.

Charge: The labeling of the article, when shipped, contained false and misleading representations that the device was an adequate and effective treatment for removing excess inches, weight, and fat, stimulating circulation, toning the tissues and spot reducing.

Disposition: Default, delivered to the Food and Drug Administration.

Relaxor Vibrator Device shipped by Powers Dry Goods Co., Minneapolis, Minn.
(F.D.C. No. 41888. S. No. 25-847 P.)

Charge: The labeling of the article, when shipped, contained false and misleading representations of fact that the article was an adequate and effective treatment for promoting circulation, easing nervous tensions, relieving aching back, firming fatty tissues, and reducing thighs, flabbiness and bulges.

Disposition: Consent, claimed by S. S. Hollender, Inc., New York, N. Y. and relabeled.

Healthmore Chair shipped by Wizard Mfg. Co., from North Hollywood, Calif.
(F.D.C. No. 41706. S. No. 28-502 P.)

Results of Investigation: The device was indicated to be an upholstered foam rubber-cushioned, reclining, and oscillating chair equipped with a heating element and capable of providing vibration.

Charge: The labeling of the device, when shipped, contained false and misleading representations that the device was effective for overcoming arthritis, bursitis, rheumatism, poor blood circulation, fatigue, tension, and for providing improved health.

Disposition: Consent, claimed by Wizard Mfg. Co. and relabeled.

Vibrator Device shipped by Hallmark System from Milwaukee, Wis.
(F.D.C. No. 42071. S. No. 26-457 P.)

Results of Investigation: The device was an upholstered, carrying case-type device containing an electric motor providing vibration.

Charge: The labeling accompanying the article, when shipped and while held for sale, contained false and misleading representations that the article was an adequate and effective treatment for arthritis, bursitis, rheumatism, relieving simple constipation, stimulating blood circulation, relieving aches and pains, breaking down fatty tissues, and reducing "anywhere you have excess weight."

Disposition: Default, delivered to Food and Drug Administration.

Meprobamate Tablets shipped by Hall Pharmacal Co. Inc. Brooklyn, N. Y.
(F.D.C. No. 41895. S. No. 4-401 P.)

Results of Investigation: Analysis showed that the article contained approximately 400 milligrams of meprobamate per tablet.

Charge: The statement on the drum label "For Investigational and Export Use Only." was false and misleading as applied to the article; and when shipped, the article was a new drug which may not be introduced into interstate commerce, since an application filed pursuant to law was not effective with respect to such drug.

Disposition: Default, destruction.

Meprobamate Tablets shipped by Hall Pharmacal Co. Inc., Brooklyn, N. Y.
(F.D.C. No. 41894. S. Nos. 29-956/7 P.)

Results of Investigation: Analysis showed that the article (both lots) contained approximately 400 milligrams of meprobamate per tablet.

Charge: While held for sale, the statement on the label of the article "For manufacturing,

processing, or repacking in the preparation of a new drug limited by Federal law to investigational use — For Export Only" was false and misleading; the article was a new drug, and an application filed . . . was not effective with respect to such drug.

Disposition: Consent, destruction.

Meprobamate Tablets and Meprobamate Powder shipped from New Jersey to New York
(F.D.C. No. 41764. S. Nos. 62-771 M, 29-942 P.)

Charge: The articles failed to bear labels containing (1) the name and place of business of the manufacturer, packer, or distributor, and (2) an accurate statement of the quantity of contents. The labeling of the articles failed to bear the common or usual name of the drug; the labeling of the articles failed to bear adequate directions for use; the meprobamate tablets were an imitation of another drug, namely, Miltown, and were offered for sale under the name of another drug, namely, Miltown; the labeling of the articles failed to bear the statement "Caution: Federal law prohibits dispensing without prescription." The Meprobamate tablets were a new drug, and an application filed pursuant to the law was not effective with respect to the drug.

Disposition: $1,800 fine and probation for 5 years.

Aspirin Tablets shipped from Memphis, Tenn.
(F.D.C. No. 41700. S. No. 34-029 P.)

Results of Investigation: Examination showed the article to be 5 grain aspirin tablets containing 0.55 per cent free salicylic acid, whereas, the United States Pharmacopeia permits a maximum of 0.15 per cent free salicylic acid per aspirin tablet.

Charge: The quality and purity of the articles, while held for sale, fell below the standard for aspirin tablets set forth in the United States Pharmacopeia since the article contained more than the permitted amount of free salicylic acid. The labeling of the article failed to bear adequate warnings against misuse by children, in that, in lieu of a dosage statement for children under three years of age, it did not bear a statement that for the three-year and under-age group a physician should be consulted for dosage, and its label did not bear a statement warning that the product should be kept out of reach of children.

Disposition: Default, destruction.

Niagara Thermo-Cyclopad Home Unit shipped from Adamsville, Pa.
(F.D.C. No. 41478. S. No. 15-673 P.)

Results of Investigation: The home unit was composed of a kit consisting of a Thermo-Cyclopad with a motor having Cyclo-Massage action, contained in a heating pad of foam rubber which held a heating coil, with a control box; also a hand massage unit with a control box.

Charge: The labeling of the article, while held for sale, failed to bear adequate directions for use in the treatment of polio, polyneuritis, paralytic stroke, paralysis caused by spinal injury, prevention of ulcerated teeth, prevention and treatment of colds and sinus trouble, treatment of muscular dystrophy, multiple sclerosis, crippling arthritis, baldness, stomach ulcers and influenza, which were the diseases and conditions for which the device was offered in oral advertising at Toledo, Ohio, on February 12, 1958, by Mrs. Ruth Mitchell, a saleswoman for General Home Service, Inc., trading as Niagara of Toledo.

Disposition: Default, delivered to Food and Drug Administration.

Clinical Thermometers shipped by Fulton Thermometer Co., Brooklyn, N. Y.
(F.D.C. No. 42044. S. No. 38-396 P.)

Results of Investigation: Examination of 24 thermometers revealed that 4 thermometers failed to meet the labeled standard of accuracy, and that 24 failed to meet the pigmentation retention tests set forth in Commercial Standards CS 1-52.

Charge: The quality of the article, when shipped, fell below that which it purported and was represented to possess; and the following statement in the labeling of the article was false and misleading; "This certifies that this Fulton Fever Thermometer has been examined and tested and is correct within plus or minus 2/10 degree at 98 F. and 102 F. and 3/10 degree F. at 106 F. or its equivalent in centigrade scale."

Disposition: Default, destruction.

Slenda-Matic Devices shipped by Grayline Co., Chicago, Ill.
(F.D.C. No. 41794. S. Nos. 25-239 P, 26-551 P.)

Results of Investigation: The labeling indicated that each device was a wooden frame box upholstered with polyurethane foam and covered with vinyl material, and that a rheostat-control electric motor providing vibration was enclosed in each box.

Charge: The labeling of the devices, when shipped, contained false and misleading representations that the devices were capable of providing an adequate and effective treatment for improving circulation, easing tensions, reducing weight, regaining a firm, trim, slender figure and removing fatty tissues.

Disposition: Consent, claimed by E. B. Meyrowitz, Inc., St. Paul, Minn., and relabeled.

Ozone Generator shipped from Germany
(F.D.C. No. 41454. S. No. 41-302 P.)

Results of Investigation: Each device consisted of a horizontally mounted mercury-containing glass tube, completely enclosed and covered with a protective plastic shield.

Charge: The labeling accompanying the devices, while held for sale, contained false and misleading representations that the devices were effective for overcoming coughs, headache, whooping coughs, tuberculosis, bronchitis, diseases of respiratory organs, rickets, and metabolic disturbances, and for promoting health.

Disposition: Default, destruction.

Relax-Or Cushion
shipped from New York, N. Y.
(F.D.C. No. 41817. S. No. 26-558 P.)

Results of Investigation: The newspaper tearsheets were used by the consignee with a counter display of the devices. The device appeared to be an upholstered cushion containing an electric motor providing vibration.

Charge: The labeling accompanying the article, while held for sale, contained false and misleading representations that the article was an adequate and effective treatment for relaxing away tensions, pains . . . easing nervous tension instantly, trimming the body, and reducing weight.

Disposition: Consent, claimed by John W. Thomas Co. and relabeled.

Electric Massage Pillows
shipped by Edson, Inc., Chicago, Ill.
(F.D.C. No. 41913. S. Nos. 25-944/6 P.)

Results of Investigation: The article (all models) consisted of an upholstered cushion containing an electric motor providing vibration, and the Vibra-Therm pillows also contained a dial control switch for heat.

Charge: When shipped, the labeling of the articles contained false and misleading representations that the electric massage pillows were an adequate and effective treatment for reducing fatty spots and unsightly bulges, relieving aches due to muscular strain, easing nervous tension, increasing blood circulation, and for trimming the figure; that the Travel-Mate pillows were an adequate and effective treatment for stimulating circulation, firming up flesh, reducing unsightly bulges, and trimming the figure; and that the Vibra-Therm pillows were an adequate and effective treatment for spot reducing, relieving muscle aches, easing tension, stimulating blood circulation to carry away excess fatty tissues, and slimming and trimming the figure.

Disposition: Consent, claimed by Edson, Inc., and released for relabeling. The electric massage pillows and Vibra-Therm pillows were relabeled and the vibrating mechanisms of the Travel-Mate massage pillows were removed and dismantled in lieu of relabeling such pillows.

Electric Vibrator Pillow
shipped by P. J. Gould Co., Chicago, Ill.
(F.D.C. No. 41791. S. No. 25-229 P.)

Results of Investigation: The label indicated that the device was a corduroy covered polyether foam-filled cushion containing an electric motor capable of providing vibration action.

Charge: The label of the article, when shipped, contained false and misleading representations that the device was an adequate and effective treatment for reviving sore and tired muscles, relaxing and easing nervous tension and massaging away excess pounds.

Disposition: Default, delivered to the Food and Drug Administration.

Berkeley Springs Water
shipped from Berkeley Springs, West Va.
by Berkeley Club Bottling & Mfg. Co., Inc.
(F.D.C. No. 41979. S. No. 4-831 P.)

Charge: The label on the bottles of the article, when shipped, contained false and misleading representations that the article was effective in the treatment of rheumatism, gout, diabetes, liver disorders, stomach disorders, and for providing youthful vigor.

Disposition: Default, destruction.

Exercycle Devices
shipped from Hartford, Conn., by the
Exercycle Corp.
(F.D.C. No. 40644. S. No. 68-225/6 M.)

Results of Investigation: The device consisted of a framework resembling a wheelless bicycle equipped with an electric motor which produced motion of the pedals, seat, and handlebars.

Charge: The labeling accompanying the article, when shipped, contained false and misleading representations that the device was effective for providing a daily rejuvenating treatment, streamlining one's figure, increasing one's powers of endurance, improving one's chances against certain types of heart attacks, improving the body metabolism, strengthening the heart, keeping the joints flexible, improving the digestion and elimination, and equalizing the blood pressure; overcoming stagnation of blood circulation and body metabolism, breathlessness, circulatory disorders, lack of strength, pep, and energy, overweight, and premature old age; making one into a "new person," enabling one within 10 days to feel younger, and in 30 days enabling one to stand taller, feel lighter, look healthier, eat heartier, and sleep more soundly; providing positive weight control by "burning up" excess calories before they turn into dangerous fat; enabling a person past 60 to have the body and stamina of a young healthy man of 35, with high energy, strong heart, normal blood pressure, regular elimination, quiet nerves, lungs in top shape, erect posture, and muscles and joints flexible and

pliable, with the feel of a youngster and the working ability of "the proverbial horse"; helping the heart by keeping the heart muscles from becoming soft, flabby, and weak; overcoming a tendency to be easily winded while climbing stairs, lifting heavy objects, or engaging in strenuous work; alleviating any disease, ailment, or injury which has affected the conditions of the shoulders, arms, back, legs, stomach, pelvic region, chest, and other parts of the body; acting as a "heart-conditioning, fat-consuming and muscle-toning" exercise; preventing the "chronic middle-aged ailments" such as digestive upsets, heartburn, acidosis, postural diabetes, constipation, headaches, neurasthenia, fatty degeneration of the heart, breathlessness, chronic fatigue, piles, "heart failure," kidney disorders, chronic ailments, and sudden death; preventing high blood pressure, albuminuria, glycosuria, cerebral hemorrhages, angina pectoris, and Bright's disease; preventing one from being a hopeless cripple due to arthritis; enabling a diabetic to cut down the necessary daily dose of insulin; overcoming the after-effects of infantile paralysis; overcoming serious spinal injury and its after-effects; overcoming convulsions in persons who would otherwise have convulsions at frequent intervals; overcoming high blood pressure; overcoming low blood pressure; and overcoming stiff and swollen joints.

Disposition: Consent, claimed by Exercycle Corp. and relabeled.

Vibro-Massage Unit
shipped from Lohrville, Iowa,
by Giro Power Mfg. Co.
(F.D.C. No. 42203. S. No. 29-637 P.)

Results of Investigation: The device consisted of a stand or base into which a long metal tube with an electric motor on top was mounted. A long web belt was attached to each end of the motor and when the motor was switched on, the belt would vibrate. The motor was enclosed in a protective and decorative covering, to which a dial was attached for adjusting the speed of the motor.

Charge: The labeling accompanying the article, when shipped, contained false and misleading representations that the article was an adequate and effective treatment for relieving stiffness and soreness; reducing excess weight; improving elimination, weak instep, sore feet, and impaired circulation; breaking up congestion; stimulating kidneys and the nerves running to the intestines; overcoming congestion in the lower lungs; improving the digestion; overcoming liver sluggishness; overcoming congestion of the bronchial tubes and lung trouble; providing a deep kneading action for relieving congestion and sluggishness; helping to wake up dormant, congested organs in the abdomen; "doing away with unwanted bulges and fatty accumulations"; causing "pounds . . . to disappear"; and overcoming nervous tension.

Disposition: Consent, claimed by Edwin P. Farr and Joseph E. Farr, Dallas, Texas, and relabeled.

First Aid Kits
shipped from St. Louis, Mo.
(F.D.C. No. 41855. S. No. 31-495 P.)

Results of Investigation: Examination showed that the article was a canvas strip consisting of 3 pouches containing 1 bandage dressing and an iodine applicator, 1 bottle of Frazer's Solution, 6 "Band-Aid" strips, 1 card of safety pins, 1 roll of rubberized material for wrapping sprains, 2 tubes of boric acid, and 3 applicator bottles of tincture of iodine or 2 tubes of petrolatum. The Frazer's Solution showed the quantity of contents to be 71 per cent of the amount declared on the label, and the bottles were abnormal because of corrosion and leakage. The kit container failed to declare the contents, the bandage dressing was unlabeled, the roll of rubberized wrapping did not bear directions for use, and the boric acid carton declared the presence of seasickness preventive which was not present.

Charge: The quality of the Frazer's Solution, while held for sale, fell below that which it purported and was represented to possess since the bottles were abnormal because of corrosion and leakage; the label of the Frazer's Solution which declared the quantity of contents to be 1 ounce. The carton label of the boric acid was false and misleading since it declared the presence of seasickness preventive which was not included. The label on the canvas kit container and the bandage dressing did not bear the name and place of business of the manufacturer, packer, or distributor, and a statement of the quantity of contents. The canvas kit container failed to bear a label containing the common or usual name of the active ingredients present in the kit components; and the labeling of the bandage dressing and the roll of rubberized wrapping failed to bear adequate directions for use.

Disposition: Default, destruction.

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3. *Contributions will be accepted from medical students only.*

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7. The winner shall receive a cash award of $200.

8. The winner shall be determined by the Awards and Prizes Committee of the American Congress of Physical Medicine and Rehabilitation.

9. All manuscripts will be returned as soon as possible after the name of the winner is announced.

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